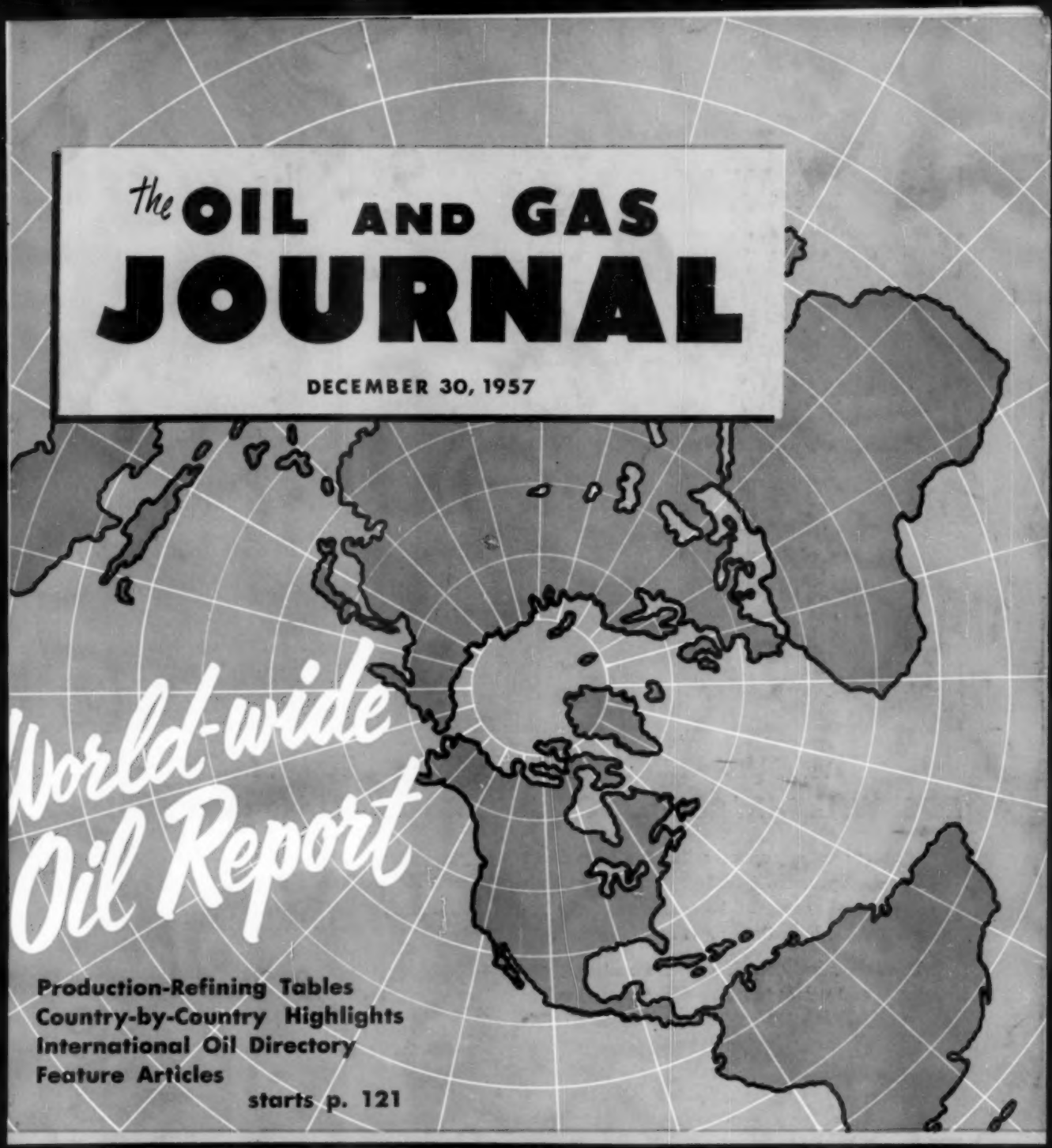
the OIL AND GAS JOURNAL

DECEMBER 30, 1957



World-wide Oil Report

Production-Refining Tables
Country-by-Country Highlights
International Oil Directory
Feature Articles

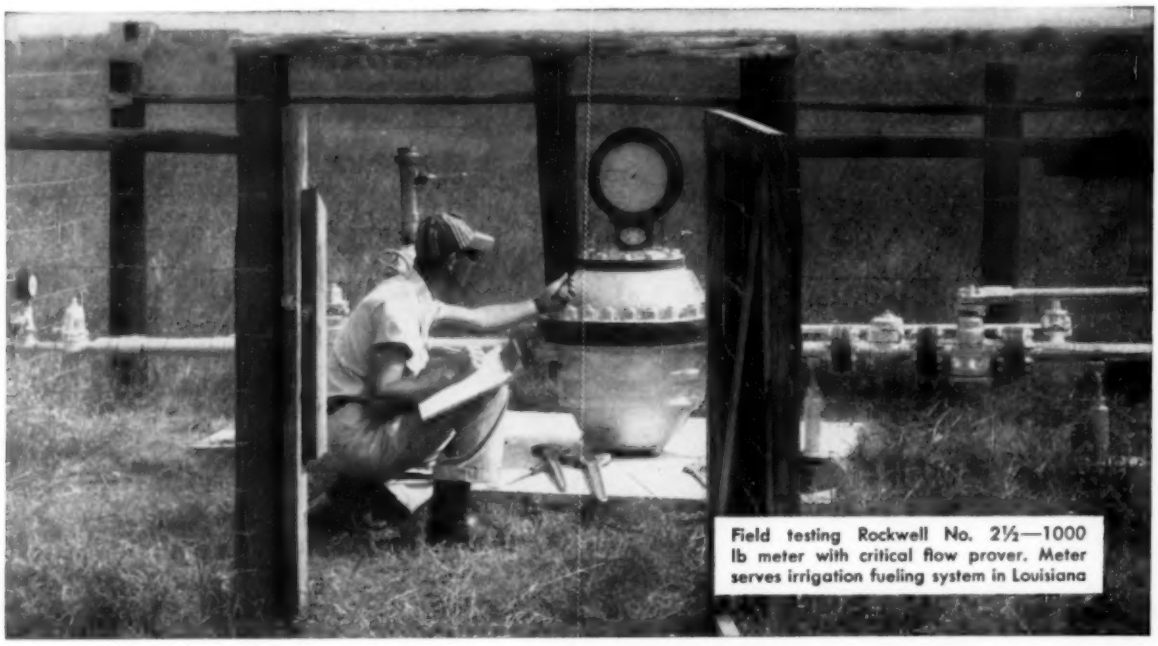
starts p. 121

Refinery-Building Boom Goes Abroad p. 103

What Oil Can Expect From Next Congress p. 106

Gas Biting into Oil Markets—And Still Hungry p. 110

HOW TO MEASURE GAS AT 967 lbs. PRESSURE



Field testing Rockwell No. 2½—1000 lb meter with critical flow prover. Meter serves irrigation fueling system in Louisiana

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OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
Dec. 30, 1957

You can't write 1957 off as all bad for oil:

Big developments mark the year's work. Even some of the sore spots show signs of healing as the year ends.

Journal editors took a quick look back before entering 1958 and recalled these industry high points:

Crude prices advanced early in the year.

But soft markets, rising costs, general downturn of the economy took away some of the luster.

Refiners joined producers in feeling a pinch. Major and independents alike cut runs. Idle units put red ink on plant ledgers.

Some improvements were showing up in many plants at end of year, permitting resumption of capacity throughputs. Increased government procurement of avgas early in 1958 is expected to brighten over-all outlook.

Gasoline octanes continued brisk upward spiral.

Premium grade rose one full number; regular one-half.

Multigrade flurry settled down to five majors. Many others boosted premium quality and price.

In processing, isomerization made its bow. Hydrotreating capacity nearly doubled. Nuclear research quickened for future processing.

Offshore activity in the gulf began levelling off.

Low allowables contributed to slump in offshore development drilling just as they did onshore. Wildcatting dropped even more sharply. Chief reason was moratorium on lease sales.

Offsetting this pessimistic outlook is sudden emergence of natural gas as important factor in tidelands operations.

Gas reserves offshore commanded record prices.

They promise reasonable payout in fields previously shut in.

California tidelands had another year's delay.

Early optimism soured. Legislature withdrew all acreage offerings and later raised royalty rates.

Miscible-phase displacement made its debut. Producers started a half-dozen big projects full scale without usual pilot operations. Process promises to get as much as twice the oil from reservoirs as other secondary-recovery methods.

Lease automatic custody transfer units snowballed. Many producers, most pipeliners show tendency to prefer positive-displacement meters in the units.

Pipeliners had a banner year.

Gas from Canada and Mexico moved into the U. S.

Canadian supplies promise big economic impact on U. S. West Coast and spell some big projects in the future. Trans-Canada pipeline started partial operation that means big things for eastern Canada with side effects on U. S. Midwest.

Crude lines opening Four Corners region to markets both west and east started construction during the past year.

In products lines, Little Inch conversion appeared in clear again. Laurel Pipe Line announced industry's first products system to use pipe as large as 24-in.

Pipeline technology saw Westcoast Transmission become first system to install new engine-driven centrifugals at all downstream stations. Gulf Interstate further pioneered remote stations. Gas turbines gained wider acceptance at compressor stations.

Drilling had a so-so year.

Total completions hit the skids in second quarter, did not pick up until early fall and then headed down again.

Soft crude markets, low allowables, drilling budgets taxed by big foreign work, high costs of leases, and rising drilling expenses all got blame for the sudden shift.

Exploration provided some good news.

Hottest play in U. S. for year was Paradox basin. Few wells there have made less than 1,000 bbl. daily on potential test. Play is still believed in its infancy.

Amerada's Outlook discovery in Montana touched off deep pre-Mississippian play along U. S.-Canada border.

Saskatchewan trend jumped into North Dakota, giving the state 21 strikes and all-time high rig activity for year.

Mid-Continent's top play came in northwestern Oklahoma and Texas Panhandle. First oil was found in the Palo Duro basin. Deep successes continued in southern Oklahoma's Carter Knox area.

First commercial discovery on a salt dome in northern Louisiana came at Minden dome. Texas' deepest salt dome also was found at Pescadito in Webb County. But well failed.

Mississippi had a rash of Lower Cretaceous strikes. They were on a trend encircling the state's waist, stretching from Mobile, Ala., to the Mississippi River at Valley Park. At year's end, Mobile had its first townsite drilling.

On Pacific Coast, Washington become thirty-first oil-producing state. And a major discovery focused attention on the Kenai Peninsula in Alaska.

Canada made new strides.

British Columbia had seven new oil fields.

Alberta came up with Virginia Hills, Edith Lake, Swan Hills, Kaybob, Iosegun and Innisfail—all sizable discoveries that mean plenty of development work.

Gas also loomed large. String of important discoveries now stretch along Alberta's Foothills from U. S. border to British Columbia border. Chief discoveries: Castle River-Waterton, Stolberg, Lovett River, Mountain Park, Lambert Creek.

Free world weathered Suez Canal closing.

Production in the free world outside U. S. and Canada made a 9.8 per cent gain. Reserves took even bigger 12 per cent jump.

Important discoveries came from Venezuela's Lake Maracaibo and Saudi Arabia in Middle East.

Import controls topped Washington developments.

After 2 years of backing and filling, the cabinet committee adopted definite program as a last step to ward off formal controls.

Applied first east of the Rockies, the program was extended to the West Coast last week. Allocations were set at 220,100 bbl. daily, a sharp cut from average imports over past 2 years.

A refinery-building boom is taking place in the free world outside the U. S.

Refiners abroad are currently spending a billion dollars to boost capacity by nearly 1½ million barrels daily. Just like their colleagues in the U. S., these refiners are stressing product quality with modern catalytic processes.

This looks like only the beginning.

Energy needs are skyrocketing abroad and oil is expected to get a lion's share of this potential new market (p. 103).

Threat to crude markets even greater than imports is going unnoticed by many domestic oil producers.

Natural gas has increased its market stature at a faster clip than either imports or crude. This is the picture since the war:

Domestic crude filled 65.2 per cent of the nation's hydrocarbons market in 1946, dropped to 50.4 per cent this year.

Natural gas' share of the market rose from 25.3 per cent to 33.5.

Imports rose from 5.2 to 10.5 per cent.

What makes the gas threat tough is this: It defies control. Gas usually is produced as a result of oil operations, and it's difficult to separate them. Gas isn't subject to proration to market demand. It's usually sold under long-term contracts. But it keeps coming to market in ever-growing volumes (p. 110).

Congress, opening next week, will take up some key oil issues before it winds up the session.

Topping the schedule are three:

Harris bill to free independent gas producers from public-utility type control. It's now given only 50-50 chance to pass.

Depletion allowance for oil and gas. It may be cut on foreign oil in a move to pick up more revenue.

Extension of Reciprocal Trade Act. Success of import-control program may influence action on this measure.

Politics, sputniks, and missiles will dominate the session. What congressmen say and do about oil will be determined by the upcoming elections (p. 106).

Drilling contractors have won another round with organized labor in Permian basin.

National Labor Relations Board holds that drillers employed by two firms are supervisors and not eligible for union membership.

Decision deals heavy blow to union efforts to organize drilling crews in the basin. Union already has lost two elections with other contractors.

Subsidies for drilling have been set aside by the Australian Government.

They total $1,120,000 annually for next 4 years.

Idea is to encourage drilling to obtain stratigraphic information.

The subsidies will be granted to oil companies willing to drill in areas not previously explored at depth. Each subsidy will be limited to not more than half the well cost.

Response so far has been favorable. Applications from oil companies to participate now are under study.

First plane to fly without petroleum-based fuel has been ordered by the Air Force.

Boron-type fuel under development by Olin Mathieson Chemical Corp. will be used. If chemical fuel is not ready by time plane is built, it can burn conventional jet fuel.

North American Aviation will build the ship. It is designed to fly faster than 2,000 m.p.h., at heights over 70,000 ft., with a range of more than 6,000 miles.

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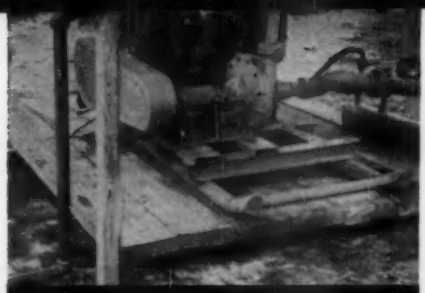
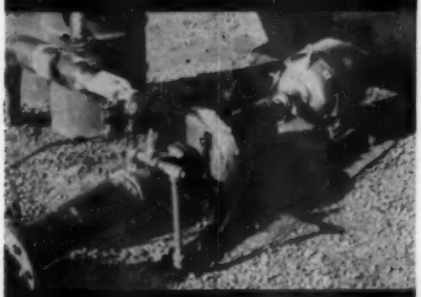


Water flood transfer pump



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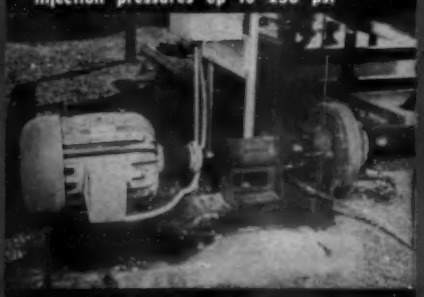

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IN THE NEWS

General Interest:

Congress Will Tackle Some Key Oil Issues Next Week 106
National Supply Will Be Merged With Armco Steel 107
Imports-Control Program Extended to West Coast 108
Jersey Stockholders Grab Big Stock Offering 113
Asian Flu Bug Bit Oil Industry Lightly 114
Zimmerman Named New President of Bethlehem Supply 117
No Change Seen for Middle East 50-50 Profit Formula 119
International Oil Makes Big Strides in 1957 120

Pipelining:

Decision on Trans-Canada Exports May Be 2 Years Off 112
Pipeline Briefs 113
Promoters Renew Plans for Oklahoma-St. Louis Line 114
Memphis Decision Causes Firms to Call Off Project 116
Little Inch Conversion Clears Its Final Hurdle 117
First Sahara Crude Moving to Mediterranean 119
Contract Awarded for Big Iranian Pipeline and Terminal 120

Production:

Natural Gas Now Big Factor in Declining Oil Market 110
Nominations for Alberta Crude Rise for January 113
New Mexico May Change Double Prorationing Policy 116

Processing:

Refinery-Building Boom Abroad Paced by Energy Demand 103
Propane Prices Boosted to 5 Cents a Gallon 112
Kellogg Offers New Acetylene-Ethylene Process 113
Processing Briefs 117
Carter Throws Turkey Dinner for Christmas Eve Shifts 118

Drilling:

Contractors Win Round in Fight With Union 112
Richfield's Artificial Drilling Island Nearly Completed 113

Exploration:

Long Legal Battle in Sight on Prize Navajo Tracts 113
Three-States Natural Gas Wins Alaskan Lease 113
Trinidad May Seek More Money for Offshore Rights 120
Mojave Desert Sands May Hide Surprises in Oil 267
North Dakota Making Enviable Oil-Discovery Score 268

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World-Wide Oil Report

Summary of Journal's World Survey 121

A recapitulation of figures for reserves, producing and drilling wells, production, and refining capacities for all the world's oil countries.

World-Wide Oil Report, Country by Country . . 123

Here in 28 pages of maps and tables, the Journal gives you a report on the international oil picture today. Small index maps help to orient you on the area, and summary tables give important figures for each individual country.

Refining Highlights 151

Countries in five principal oil-producing areas, Latin America, Western Europe, Middle East, Asia and Australia, and South Africa, are listed, with a report on refining in each country.

Drilling, Production, and Pipeline Highlights for 1957 160

An up-to-the-minute report on progress in drilling, production, and laying of pipeline in the oil countries of the world.

International Oil Directory 179

A list of companies operating outside the United States and Canada, with brief descriptions of their operations, and names of their principal officers.

Tanker-Building Boom Breaking Records . . . 196

By John J. Winterbottom

Tonnage now on order hits 40 million deadweight tons as reaction of the Suez closing booms this industry.

Australian Oil Search Gets Boost 203

By W. O. Mott

Exploration activity in Australia shows upward trend as government allocates partial-subsidy funds.

Lacq a Shot in Arm to France 208

By Maurice Moyal

Natural gas, sulfur, and gasoline production show good potential in 100 wells scheduled for field in southwestern France.

Israel's Heletz Field Producing 1,500 Bbl. Daily 215

By Joseph A. Kornfeld

First producing oil field for Israel consists of 20 wells in southern coastal plain.

TECHNOLOGY—OPERATION

The Foreman's Page 218

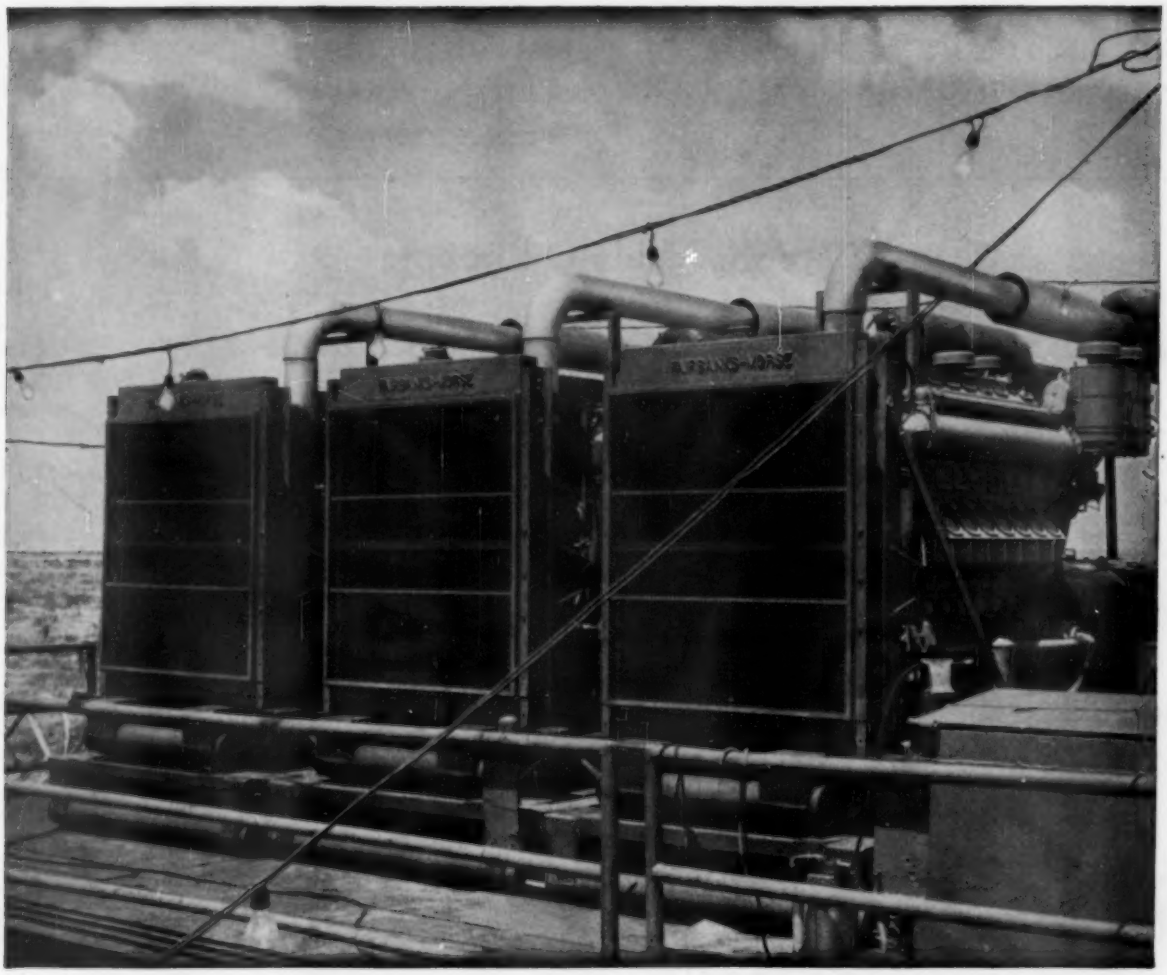
NGP Using Polyethylene Tape for Pipeline Protection 223

By Paul Reed

Taping operations and work involved in crossing a thick network of pipelines in producing areas are the principal features of a new construction project. It is the Schedule 1 section of Natural Gas Pipeline Co. of America's construction project from Bridgeport to Fritch, Tex. The Schedule 1 section consists of 80 miles of 20-in. from the Bridgeport area to the vicinity of Healdton, Okla.

DEPARTMENTS

They Say	91	OTJ—Pipelining	223	Statistical Summary	310
Calendar of Events	93	Drilling Contractors	228	Drilling Statistics	311
Journally Speaking	99	New Equipment	233	Supply Statistics	312
Editorial	101	Trade Literature	243	Refining Statistics	313
Watching Washington	109	Equipment Men in News	249	Markets	314
International News	119	Exploration Highlights	267	Classified Advertising	316
Book Review	214	Personals	307	Advertisers' Index	319



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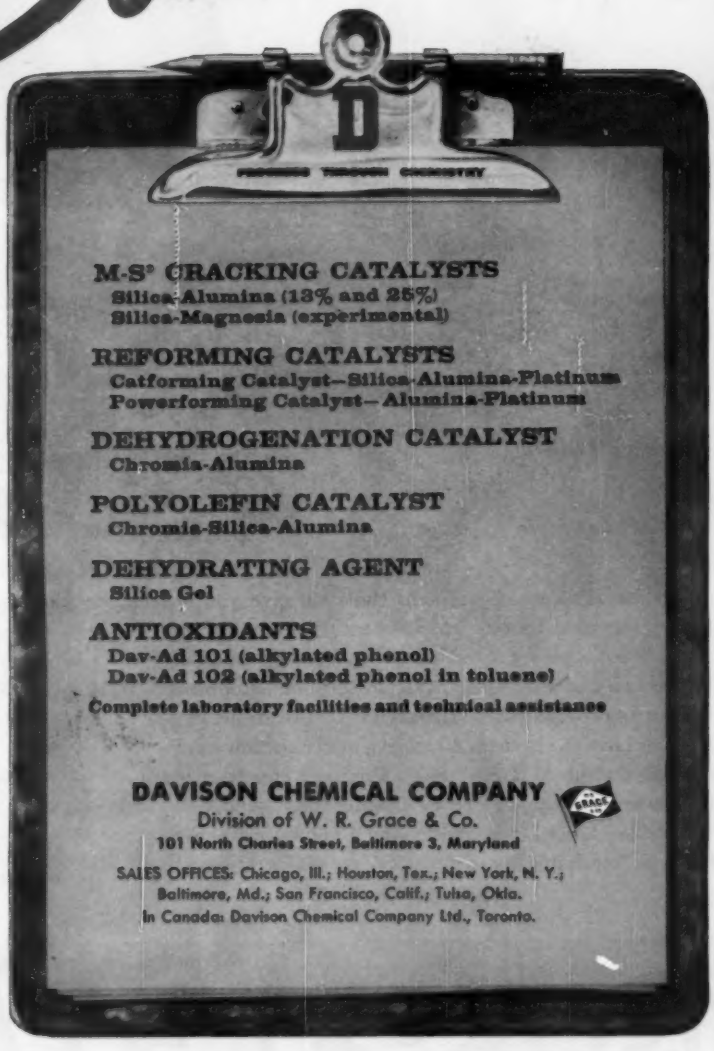

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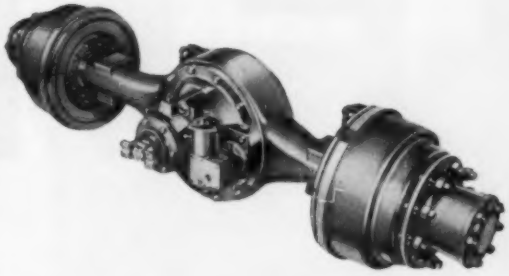

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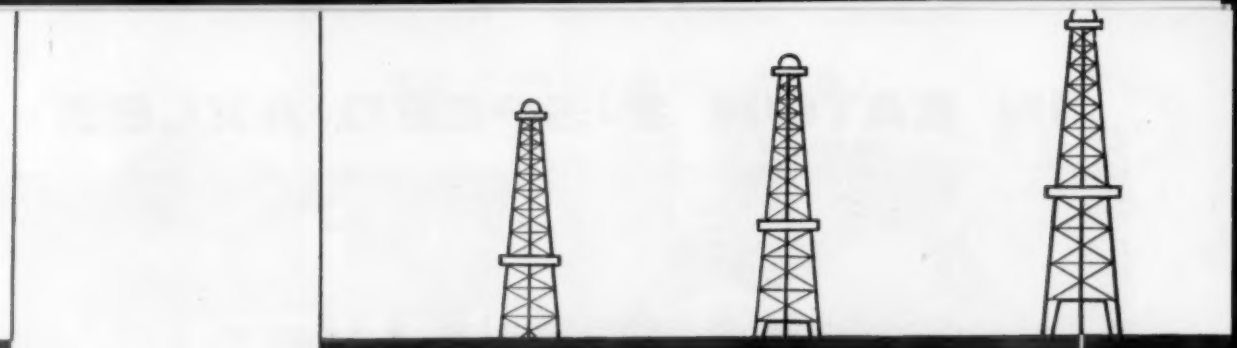

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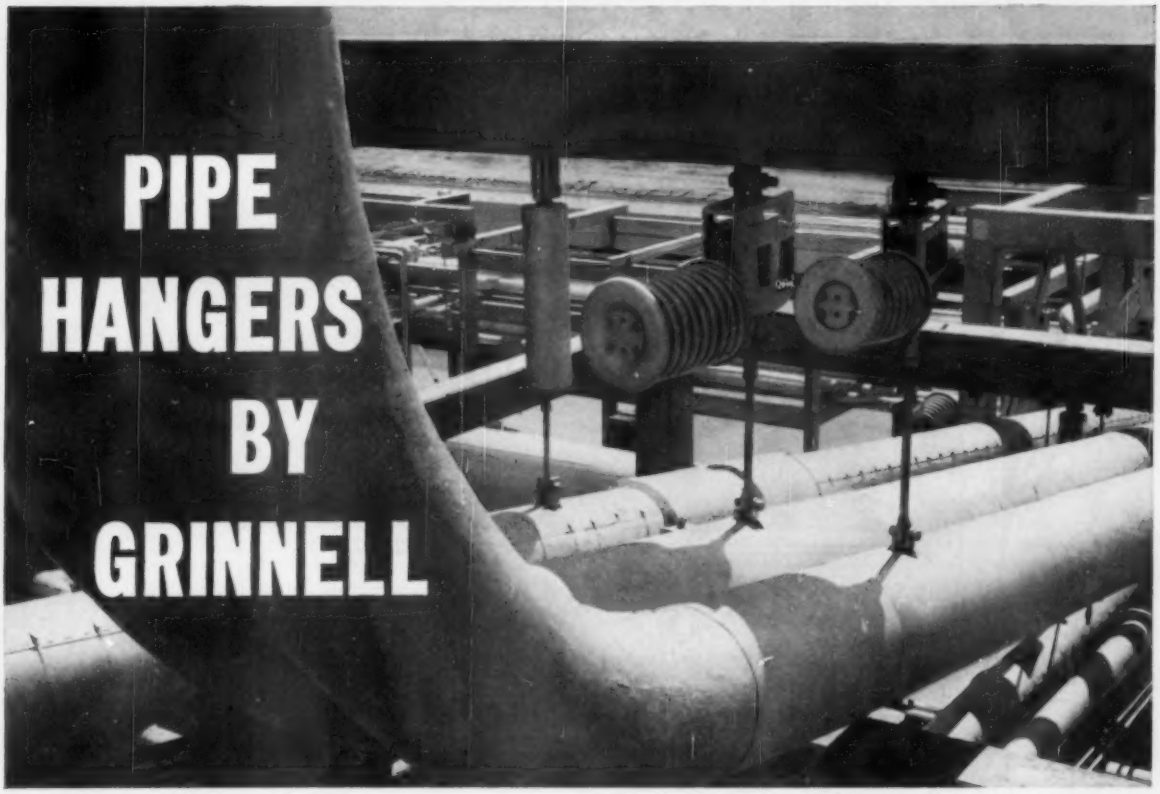
At Tidewater's new Delaware Refinery...



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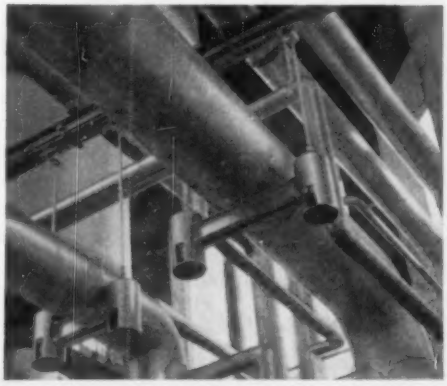
GRINNELL CONSTANT-SUPPORT HANGERS are engineered to maintain full safety factor. Constancy of support is mathematically perfect for all positions of travel. Note low headroom requirement. Load ranges from 30 lbs. to 32,260 lbs., with travels up to 12 inches.



GRINNELL VARIABLE SPRING HANGERS have pre-compression feature which assures operation of spring within its proper working range. Maximum variation in supporting force per ½" of deflection is 10½% of rated capacity — in all sizes. Available in 21 sizes for loads ranging from 50 lbs. to 28,200 lbs.

GRINNELL

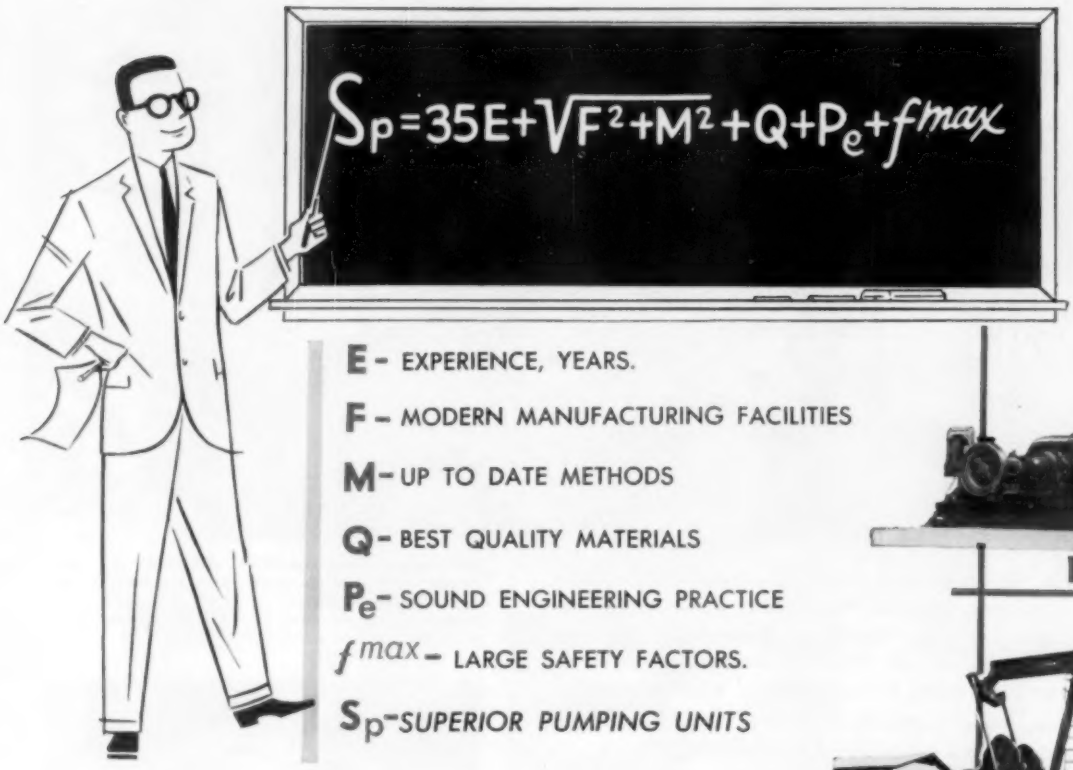
AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic fire protection systems • Amco air conditioning systems

the LUFKIN formula

FOR SELECTING THE RIGHT
PUMPING UNIT FOR YOUR WELL . . .



E – EXPERIENCE, YEARS.

F – MODERN MANUFACTURING FACILITIES

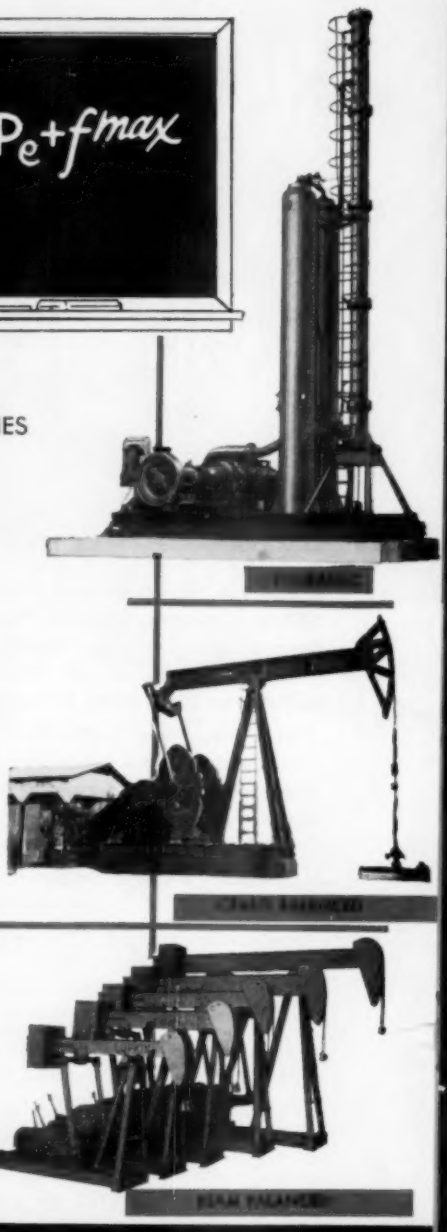
M – UP TO DATE METHODS

Q – BEST QUALITY MATERIALS

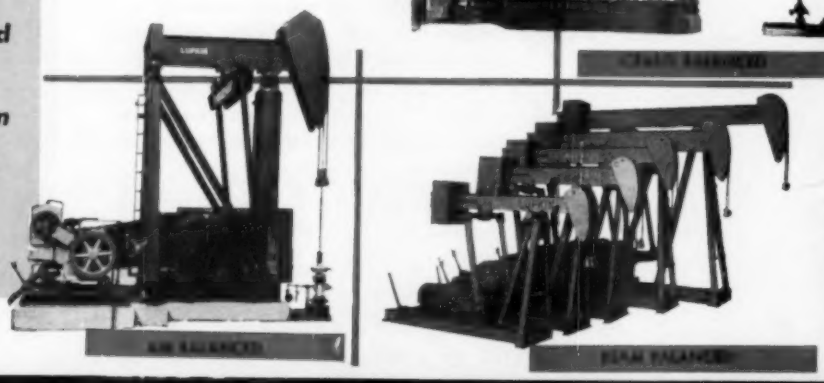
P_e – SOUND ENGINEERING PRACTICE

f^{max} – LARGE SAFETY FACTORS.

S_p – *SUPERIOR PUMPING UNITS*



There's always a standard LUFKIN unit with the right combination of beam capacity, counterbalance and peak torque for your well . . .



Lufkin **FOUNDRY & MACHINE COMPANY**
LUFKIN, TEXAS

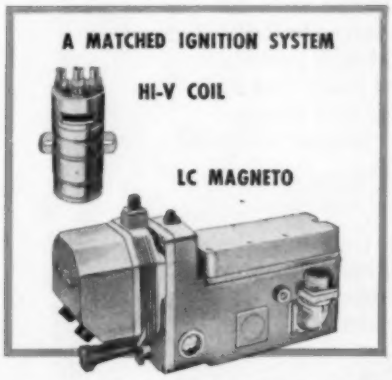
Branch Sales and Service: Houston • Natchez • Corpus Christi • Lafayette • Dallas • El Dorado • Kilgore • Odessa • Hobbs Midland • Pampa • Wichita Falls • Los Angeles • Bakersfield • Effingham • Casper • Denver • Sidney • Great Bend Oklahoma City • Seminole • Tulsa • New York • Maracaibo, Venezuela

Lufkin equipment in Canada is handled by
THE LUFKIN MACHINE CO., LTD., 9950 65th Avenue, Edmonton, Alberta, Canada, Regina, Saskatchewan, Canada

Look at All You Get in the New Bendix LC IGNITION!

1. Long service life
2. Simplified maintenance
3. Longer spark plug life
4. No unscheduled ignition shutdowns
5. Positive spark timing
6. High voltage output
7. Matched ignition system
8. Single or dual ignition
9. Flame proof
10. Low maintenance costs
11. For engines of 6 through 16 cylinders

Designed Specifically for the Petroleum Industry



Just check these outstanding exclusive features and you will know why the Bendix* LC Magneto has been engineered to meet the exacting requirements of the modern high-compression gas engines used so widely throughout the petroleum industry.

As the Bendix LC is a completely new type of magneto, it incorporates the latest development in material, engineering, design and production techniques. The result is a matched ignition system—LC Magneto plus Bendix Hi-V Transformer coils—that delivers more than ample voltage with greatly reduced maintenance costs.

For engines of 6 to 16 cylinders where top performance is a must, the new Bendix LC Magneto is the logical choice.

Complete descriptive folder is available on request.

*TRADE MARK

SCINTILLA DIVISION OF
SIDNEY, NEW YORK

Export Sales and Service:
Bendix International Division, 205 East 42nd St., New York 17, N. Y.

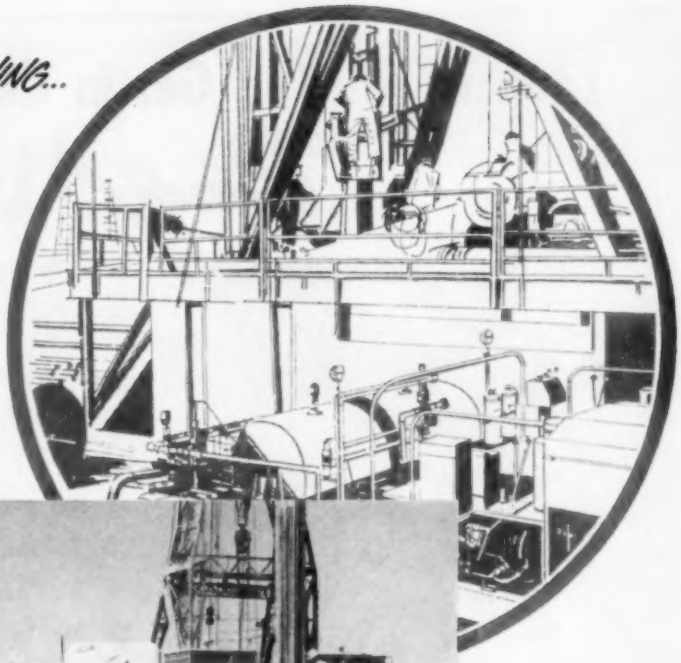
FACTORY BRANCH OFFICES:
117 E. Providencia Ave., Burbank, Calif. • Paterson Building, 18038 Mack Ave., Detroit 24, Mich. • 545 Cedar Lane, Teaneck, N. J. • 5906 North Port Washington Rd., Milwaukee 17, Wisc. • Hulman Building, 120 W. Second St., Dayton 2, Ohio • 2608 Inwood Road, Dallas 19, Texas • 8425 First Ave., South, Seattle 8, Wash. • 1701 "K" Street, N.W., Washington 6, D. C.

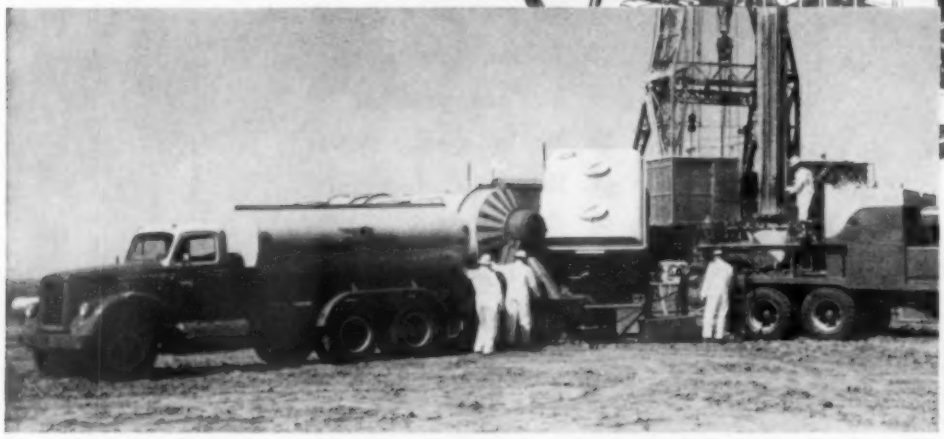
Bendix
SCINTILLA DIVISION

Bendix
AVIATION CORPORATION

GIVE YOUR WELL A GOOD BEGINNING...

WITH HALLIBURTON PRIMARY CEMENTING



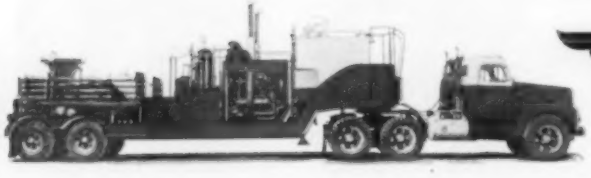


FOR PROFITABLE end-results of longer well life and a higher net rate of production, oil well protection begins with a good primary cementing job.

Halliburton primary cementing helps to provide protection and conservation of possible oil producing zones until they are ready to be tested or produced... Protection against subterranean fluids or high pressure gas that may migrate from one formation to another and flood an oil or fresh water zone... Protection against corrosion of casing from mineralized waters or stray earth currents.

In addition, primary cementing by Halliburton helps to prevent well blowout and contamination, as well as other hazards that may endanger productivity.

Help your well to a longer and more productive life from the start by specifying the initial protection of Halliburton primary cementing. You'll be joining thousands of oilmen who have relied on Halliburton since 1924. Call your nearby Halliburton representative today!

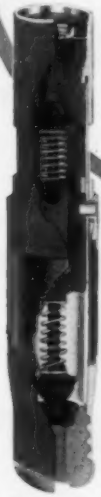


HALLIBURTON

OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

HALLIBURTON CEMENTING TOOLS AND MATERIALS ARE IMPORTANT FACTORS IN HALLIBURTON CEMENTING SERVICES



FORMATION PACKER SHOE

Installed on the first joint of a string of casing, it offers many advantages. This shoe is used in all areas where conditions require casing to be set on top of the producing formation, because:

- Packer Shoe packs off open hole below casing, protecting low-pressure formations from cement contamination during cementing.
- Packer Shoe floats in and guides casing to bottom.
- Packer Shoe has a Super-Seal Back-Pressure Valve to keep cement slurry from backing up inside the casing above the Formation Packer Shoe.
- Packer Shoe provides circulation of fluids through end of Shoe until shoe packer rubber is expanded and set.

FORMATION PACKER COLLAR

Installed on casing above the shoe joint, it helps protect a lower formation from contamination during cementing. Several joints of casing or liner may be installed on lower end of packer collar; the packer is set and cement pumped down casing and out into annulus above expanded packer.

NEW! FULL-FLOW PACKER SHOE

A packer-type cementing shoe to help protect the formation below while cementing tubing or casing in new or old cased or uncased wells. No internal parts remain in the string to be drilled out upon completion of the cementing operation... Danger of drilling fluid damage is reduced... Particularly suitable for small tubing strings.

NEW! RECIDO WALL CLEANER

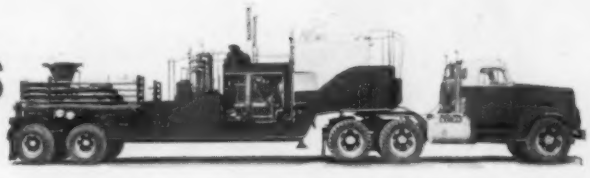
Removes filter cake from wall of bore hole to allow better bonding of cement to formation and casing.

- Flexible, tough rubber fingers minimize bore hole or filter cake damage while running casing, yet are sufficiently rugged to thoroughly clean wall when casing is reciprocated.
- Wide cleaning fingers clean broader area of bore hole wall. Aid in breaking up channeling of cement.
- Wide fluid passage areas between rubber cleaning fingers help reduce circulating pressures and bridging action of filter cake cuttings.
- Hinged type design permits fast, easy installation on casing.
- Cleaning fingers do not bend into permanent distortion.

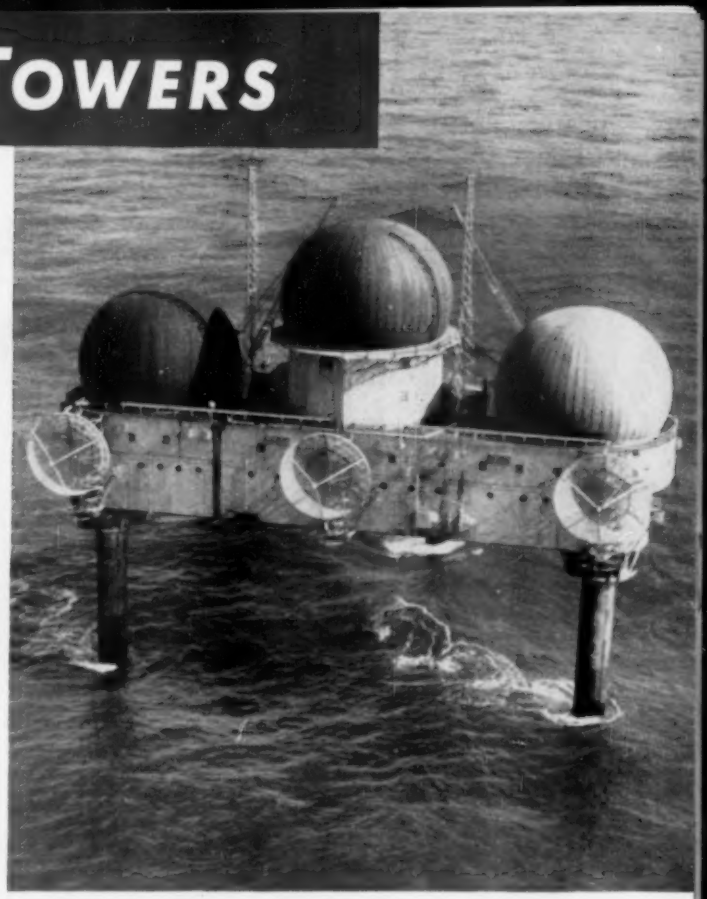
CEMENTING SERVICES

284 SERVICE CENTERS...

JUST MINUTES AWAY FROM YOUR RIG



ON TEXAS TOWERS



Wallace Process Piping Co., Inc.

Used

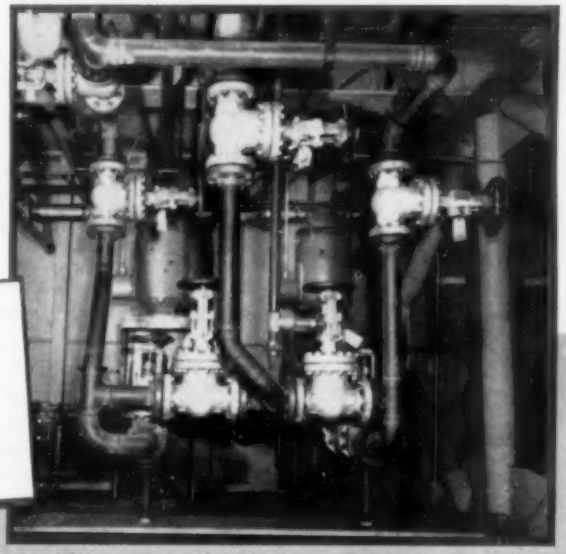
MIDWEST

WELDING FITTINGS

Among the unique installations for preservation of peace are the early warning radar "Texas Towers" off the Atlantic Coast. These artificial islands stilted to the ocean floor keep watch by radar. As is true of many defense projects, Midwest Welding Fittings played a significant part on Texas Towers.

Midwest Welding Fittings are found on unusual and in critical as well as routine jobs because of exceptional quality maintained by rigid standards of manufacture. Quality control is always above and beyond code requirements.

Whatever the piping job, you will find it to your advantage to use Midwest Welding Fittings. The many benefits you get by specifying "Midwest" are shown in Catalog 54. Ask your distributor or write us for a copy.



MIDWEST PIPING COMPANY, INC.

Main Office: St. Louis 3, Missouri (P.O. Box 433)

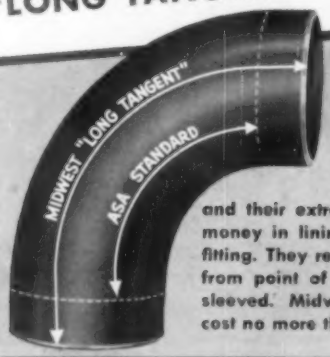
PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

SALES OFFICES:

ASHEVILLE (BOX 446, SKYLAND, N. C.) • BOSTON 27—426 FIRST ST.
CHICAGO 3—79 WEST MONROE ST. • CLEVELAND 14—616 ST. CLAIR AVE.
HOUSTON 2—1213 CAPITOL AVE. • LOS ANGELES 33—520 ANDERSON ST.
MIAMI 34—2103 LE JEUNE RD. • NEW YORK 7—50 CHURCH ST.
ONEIDA, N.Y.—282 NORTH MAIN ST. • PITTSBURGH 19, PA.—437 GRANT ST.
ST. LOUIS 4—1450 S. SECOND ST. • SAN FRANCISCO 11—420 MARKET ST.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

MONEY SAVED With MIDWEST "LONG TANGENT" ELBOWS



Here are the important advantages of Midwest "Long Tangents": They save pipe. They often eliminate short nipples and their extra welds. They save time and money in lining up and clamping pipe and fitting. They remove the circumferential weld from point of maximum stress and can be sleeved. Midwest "Long Tangent" Elbows cost no more than other elbows.

Piping on two Texas Towers was installed by Wallace Process Piping Co., Inc., as subcontractors to Steers Morrison Knudsen and Continental Copper & Steel Industries, Inc. All welding fittings were supplied by Midwest through Central Jersey Supply Co. The many advantages of Midwest "Long Tangent" Elbows were an important factor in the selection of Midwest fittings for this critical work.

7901

MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS

FR®

. . . standard on LINK-BELT oil field roller chain

U.S. Patent No. 2,517,497

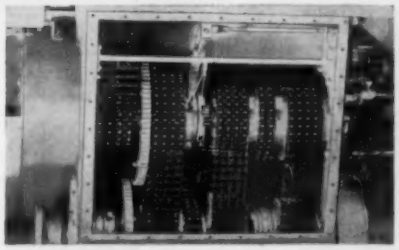
Increased sidebar Fatigue Resistance raises chain endurance limit . . . produces unmatched dynamic strength

No ordinary roller chain can long withstand the brute punishment of drilling service. That's why Link-Belt adds the FR process—a proven way to promote longer chain life. By compressing the metal around pitch holes, Link-Belt greatly strengthens the critical sidebar areas most vulnerable to fatigue . . . thus creating extraordinary *dynamic strength*.

And FR is just one of many Link-Belt "extras":

- SHOT-PEENED ROLLERS
- PRE-STRESSING
- E-Z ASSEMBLY
- CLOSER HEAT-TREAT CONTROL
- SHEPHERD'S CROOK COTTERS
- DOUBLE BOXING

Any leading supply store in the field can give you full details and a copy of Link-Belt Catalog 2780.



BREWSTER N-12 DRAWWORKS TRANSMISSION incorporates multiple-width Link-Belt Precision Steel roller chain with FR. *Since this feature involves no alteration in dimensions of chain parts,* Link-Belt roller chain is interchangeable with standard chains and sprockets.

LINK-BELT

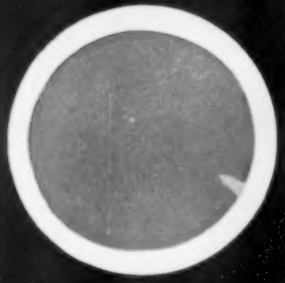
ROLLER CHAINS & SPROCKETS

LINK-BELT COMPANY: Indianapolis 6, Houston 1, Dallas 21, Odessa, Tex., Shreveport, La., Los Angeles 22, (Montebello), Scarboro (Toronto 13); Export Office, New York 7. Distributors in All Fields. 14,669

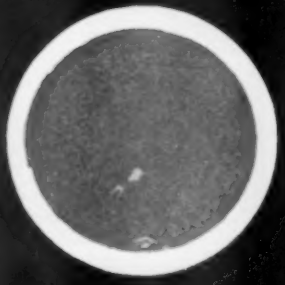
Actual photos of filters through which brine has flowed for 2000 seconds show how citric acid prevents iron precipitation which clogs pores, cuts down flow rate

Brine Contained Iron and Citric Acid

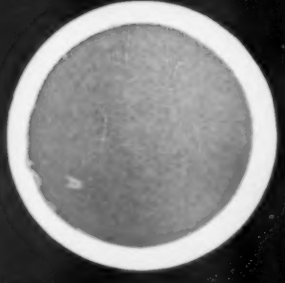
Brine Contained No Iron



Brine Contained Iron and Polyphosphate



Brine Contained Iron and EDTA



Brine Contained Iron Alone

Dramatic Test

how effectively you can improve

IN extensive laboratory tests, the Technical Service Department of Chas. Pfizer & Co., Inc., measured the rates at which brines with and without sequesterants flowed through filter discs. In each case the water used was an East Texas oil field brine.

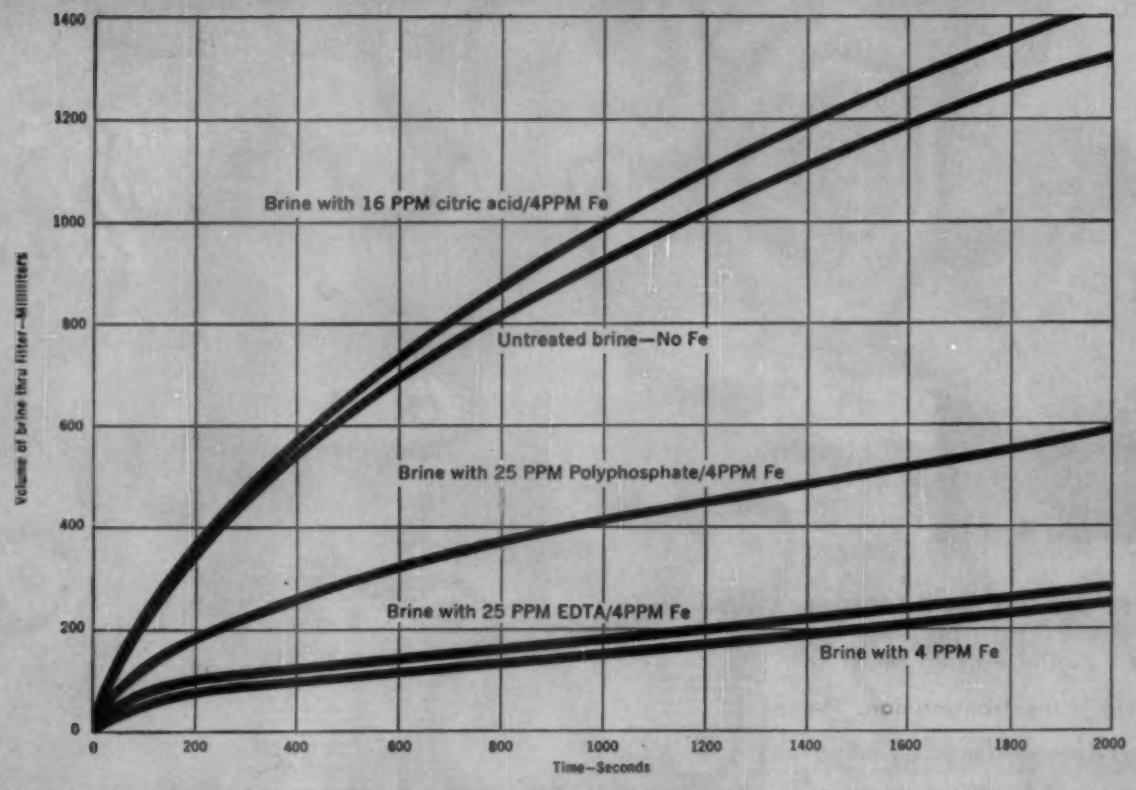
The five circles you see on the left are actual photographs of some of the membrane filter discs used. Each disc is 150 microns thick and has *50 million* pores per square centimeter! These minute pores closely simulate the sandface through which your injection water must flow.

In the lab tests, the brine was first pre-filtered to remove solid particles, then poured into five containers. Four parts per million of soluble iron was added to each container except *one*. Sequesterants were added to three of the brine solutions.

After aeration, rate of flow through the membrane filter discs was measured. The results, as you can see from the graph and the color of the discs, proved conclusive. *Citric Acid was far superior in preventing iron precipitation, and kept flow rates highest.*

Results Demonstrate

flow rates by adding citric acid to your injection water



If you want to stop iron from plugging sandface pores, add citric acid to *your* injection water. ***Pound for pound, citric acid not only sequesters iron better but also at less cost than any other agent.*** It's nontoxic, safe to handle, and works even in high calcium waters.

Pfizer supplies huge amounts of citric acid for a multitude of industrial uses throughout the world. This large volume production assures you of receiving all the citric you need without delay. For further information on preventing injection well plugging with Pfizer Citric Acid write to:

CHAS. PFIZER & CO., INC.
Chemical Sales Division
630 Flushing Ave., Brooklyn 6, N.Y.

Branch Offices:
Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.

Manufacturing Chemists

Pfizer

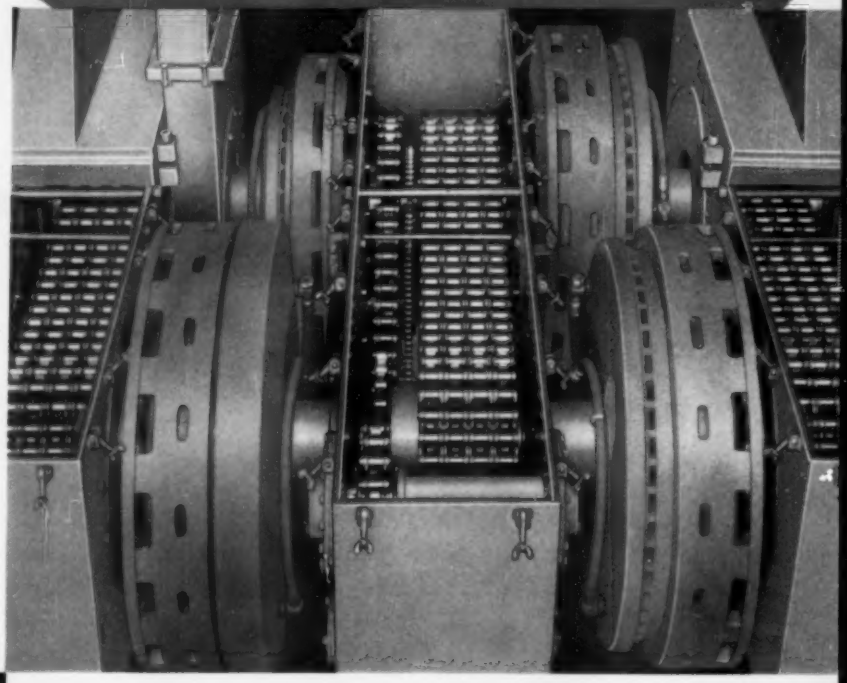
for Over 100 Years

Wilson Titan "66" rig on drilling platform "Carter Mart."

"Let me tell you . . . that Wilson Super Titan "66" is not only the world's largest rig, but the BEST!"

Says Dewey Morris, Vice President and General Manager of Morris & Hamilton Drilling Co., Inc.

"Here are the main reasons why . . . The working center of any rig is the transmission. The Wilson Transmission is an all air-tube friction clutch design and the rig is oil bath throughout with the largest drum clutches made. I have never seen anything to equal it. We have had no trouble whatever."



Wilson Super Titan "66" Transmission

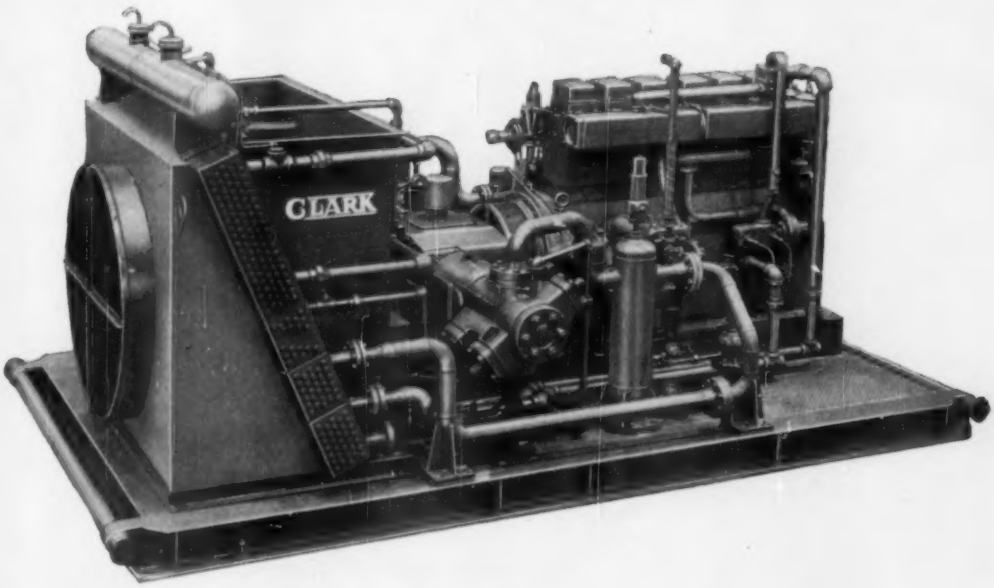
Wilson

WILSON MANUFACTURING CO., INC.

WICHITA FALLS, TEXAS, U.S.A.

The Home of RED IRON

BE MODERN
BUY WILSON



DIRECT DRIVE...

A unique feature of the Clark CFA Packaged Field Compressor

One of the simplest ways to take the bugs out of packaged field compressors is to direct-couple the compressor to the engine. Clark engineers did exactly that when they designed the new CFA. Troublesome, power-robbing belts and gears between the engine and the compressor are not required. A simple rubber block coupling takes their place. But this achievement was made possible only because the CFA is so perfectly balanced and therefore can operate at a modern 1,000 rpm. without a quiver or a shake. Furthermore, the CFA is typically Clark. It has the built-in stamina and precision of its big brothers. You'll deplete the field, but you won't wear out the Clark compressor.

There are two and four cylinder CFA models available in the 100-350 bhp. range. Your nearest Clark representative has all the facts and can tell you of other operators' experiences with the CFA.

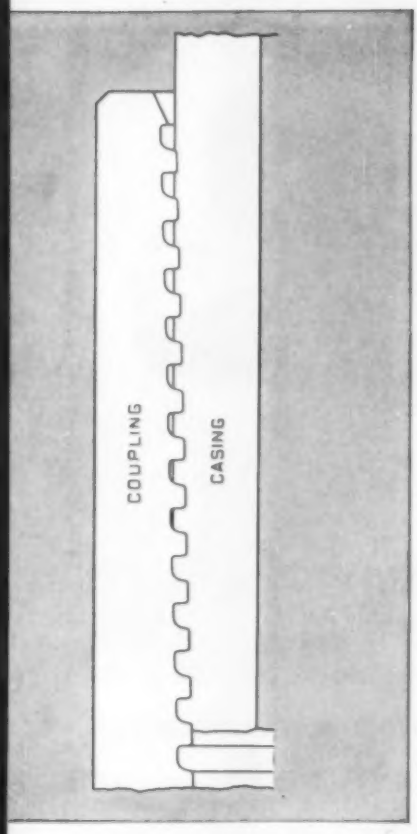
CLARK BROS. CO. **OLEAN, N. Y.**

One of the Dresser Industries

Offices in Principal Cities Throughout the World

CLARK **Packaged Field Compressors**

How long is a string?



The high tensile strength of the buttress-thread joint is due largely to the combined effect of the completely engaged runout threads and the three degree flank angle of the threads which support the weight of the casing in the well. The joint compares in strength to the body of the pipe. Casing with Buttress-Threads eliminates the need for upset-end casing, gives greater inside clearance for the drilling bit, and permits easier, faster coupling to power-tight position.

A string of oil well casing is only as long as the strength of the casing will permit. With today's deep-well casing strings running longer and heavier than ever before, smart oil men know that ordinary casing just can't carry the weight safely. That's why they so consistently specify NATIONAL Seamless Casing with Buttress-Threads and couplings for deep wells. It is specifically designed to bear the weight of unbelievably long strings of casing; and its walls possess the high collapse resistance needed to withstand the tremendous vibrations and pressures of deep-well drilling.

Super strength is the number one advantage of all NATIONAL Seamless Oil Country Tubular Products. Each section of casing, drill pipe, and tubing is pierced from a solid billet of the finest quality steel to form a seamless tube—a product well prepared to handle the toughest assignments that the deep wells have to offer. Say "NATIONAL SEAMLESS" the next time you order drill pipe, casing, or tubing.

Check these significant developments by National Tube . . .

NATIONAL DEOXIDIZED BESSEMER STEEL CASING AND TUBING—GRADES H-40, J-55

Especially well-suited for oil production because of its combination of high yield strength and good ductility.

NATIONAL WARM-WORKED CASING—GRADE N-80

An extremely high-strength casing possessing a uniformity of physical properties which gives it high collapse resistance and greater increased joint strength. It is hydrostatically tested to 80% of minimum yield strength up to a maximum of 10,000 psi.

NATIONAL DEEP-WELL CASING

A stronger casing provided to meet constantly increasing depths. Due to the severe service for which it is intended, it is hydrostatically tested to 80% minimum yield strength up to a maximum of 12,000 psi.

NATIONAL (B) BUTTRESS-THREADS

Developed to satisfy the need for a casing joint which will safely and economically support the weight of deep-well casing. The buttress-thread joint is comparable in strength to that of the body of the pipe.

For further information, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Ask for Bulletin No. 15.

SEE The United States Steel Hour. Televised alternate weeks. Consult your local newspaper for time and station.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL USS SEAMLESS

DRILL PIPE . . . CASING . . . TUBING

UNITED STATES STEEL

THE HAMMOND DIALIFT

the only membrane type conservation tank

... with full-rated vapor and product capacity at all times

... with a membrane that cannot come in contact with product

... with vapor space that can be isolated for inspection and maintenance without taking tank out of service.

Principle of the Hammond Dialift

A—DIALIFT DIAPHRAGM rises and falls to accommodate expanding and contracting vapor.

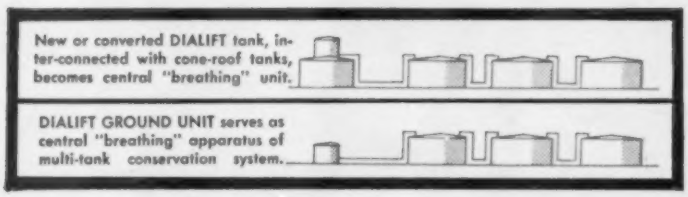
B—Vapor passes to and from tank and DIALIFT through simple elbow connection.

C—DIALIFT and tank have full-rated capacity.

D—Membrane can't come in contact with product.

E—DIALIFT can be isolated for maintenance and inspection, product tank stays in service.

The most efficient and economical vapor conservation system for new or old tanks.


New or converted DIALIFT tank, inter-connected with cone-roof tanks, becomes central "breathing" unit.
DIALIFT GROUND UNIT serves as central "breathing" apparatus of multi-tank conservation system.

THE HAMMOND DIALIFT consists of a gas-tight Vulcalock membrane attached to the inside periphery of a cylindrical metal housing to become a "breathing" apparatus to accommodate the expanding and contracting vapor as developed in product storage tanks. The DIALIFT can be used as a single conservation unit by being attached to the roof of a product storage tank or as a central "breathing" system by being manifolded to a number of product storage tanks. There are two forms of installation:—Ground type manifolded to a number of tanks to form a conservation system and integrated type whereby the DIALIFT is attached to the roof of a tank for vapor conservation for one or a number of tanks. The DIALIFT is completely isolated from the product storage tank. Vapor passes between the tank and DIALIFT through a vaporline connection. It is easy to convert old cone roof tanks to efficient vapor-saving DIALIFT installations by attaching a DIALIFT housing with membrane to the roof of the old tank and connecting the vaporline between the tank and DIALIFT.

THE HAMMOND DIALIFT ELIMINATES BREATHING LOSS AND REDUCES FILLING LOSS

Write for dialift catalog 55DL

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LeBus can engineer your spooling to save you thousands of dollars in manhours, hoisting time and line.

Whether you need new LeBus Counterbalance Spooling that guarantees trouble-free spooling, LeBus Pyramid Spooling or LeBus Helical Spooling, you can count on LeBus engineers to help you. With LeBus Counterbalance Spooling you can avoid waits caused by improper spooling, cutting in, tangled line and excessive wear. Furthermore, LeBus can give you service anywhere and use your present drums.

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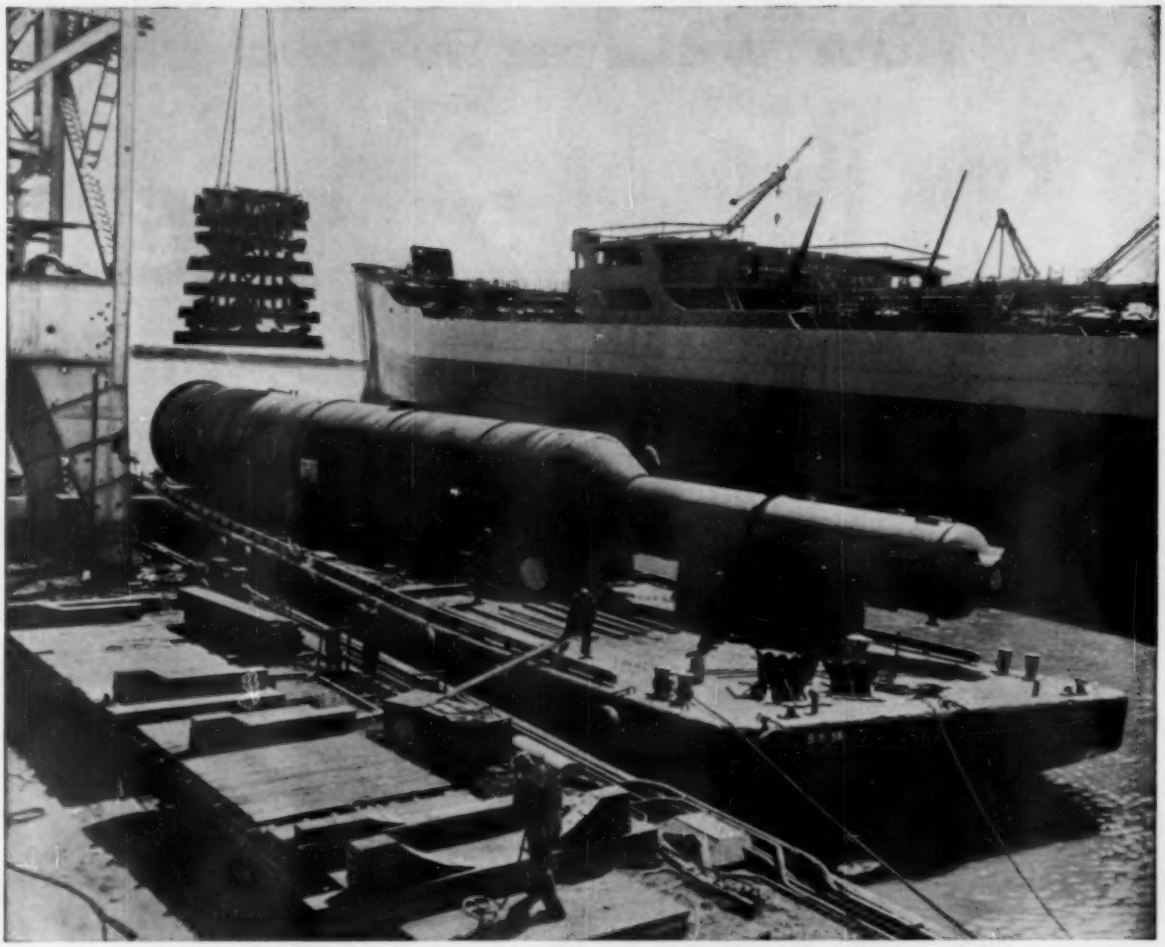
Patent Nos. Counterbalanced Spooling, Nos. 2,734,693, 2,732,150. Controlled Parallel and Helical Spooling, Nos. 2,708,080, 2,620,996. Appli. of groove ring, Nos. 2,599,936, 2,704,938 Removable-End Fillers, No. 2,716,819. Other patents pending

LEBUS . . . WORLD HEADQUARTERS FOR *Engineered Spooling* COUNTERBALANCE - PYRAMID - HELICAL



standard procedure: VERSATILITY...

The variety of work which Sun Ship's integrated shops produce for use by industries on land and sea brings a matching variety of shipping problems.

Our facilities for tidewater shipment are used to economical advantage on many of the massive structures that go into the making of the nation's petroleum and chemical industries. The barge shipment of tower and shed row baffles, shown above, is a good example.

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...by phillie gear®

...easily meet the growing need for larger fans and higher load requirements

Modern Cooling Towers and air-cooled heat exchangers require reducer drives which are engineered for the job. Gears, bearings, housings and bearing supports must meet the severe and varied load requirements of today's heavier fans, higher speeds, increased air thrusts, and more extreme atmospheric and temperature conditions.

Fans should be designed for quick and easy mounting, directly on output shafts. Unit design should allow space for close coupling of motors where this is desired. Generous service factors are necessary to meet momentary overload situations. Careful design for rigid alignment of all components, is important to assure proper installation, and long, trouble-free service life. Lubrication systems must insure maximum protection with a minimum of maintenance.

To meet these stepped-up, modern requirements, Phillie Gear has designed a new series of bevel, spiral-bevel and worm gear cooling tower drives. Each is built for a specific type of service, and is available in a complete range of sizes and capacities.

Phillie Gear Cooling Tower Drives are in service around the clock—all over the World. For complete details please request Catalog CT-561.

- **Maximum Efficiency ... 97%-98% with minimum heat loss.**
- **Precision generated Spiral-Bevel Gears, case hardened for long service life.**
- **Heavy duty housing construction.**
- **High dome permits mounting fan directly on unit, with ample clearance below fan blades.**
- **Oversize bearings insure trouble-free operation. Positive splash lubrication provides oil bath for bearings and gears.**
- **Rugged ... dependable ... economical Reducer meets all AGMA standards.**

phillie gear®

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UNIT RIG DRAWWORKS

Another Unit Rig Drawworks has chalked up an outstanding operational record. In Venezuela, this U-15 drawworks drilled for six years without requiring a single major repair. Put into operation by Loffland Brothers Company of Venezuela in 1951, this rig has drilled 78 wells, a total of 633,729 feet, with an average well depth of 8124 feet. For information on a Unit Rig to fit your drilling requirements anywhere in the world, contact your Mid-Continent representative.

Shown in operation in Venezuela is the Unit Rig U-15 drawworks powered by Cummins LRI-600 engines.

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The oil vessels can tie up to fill or discharge their tanks on all sides of the dolphin platform. On top of the platform towers a crane column with a 68-foot jib on another, revolving platform that will swing to any point of the compass. Eight miles of pipeline run from this artificial islet in the Adriatic to one of the largest refineries in Italy, three miles inland at the gates of Ravenna.

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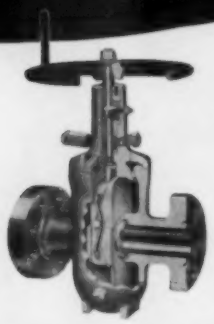
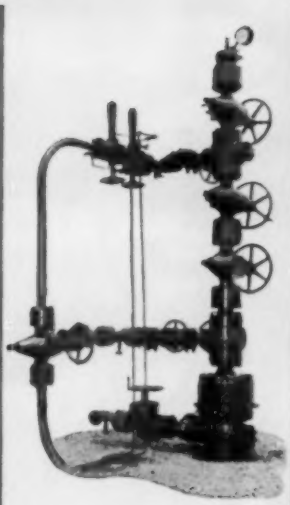
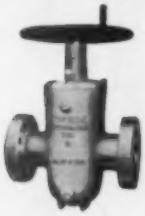


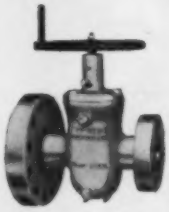


Screw-End Valves
Size: 2"
500 lbs. and 800 lbs. Working Pressure

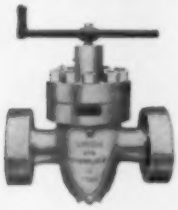


Flanged Valves
Sizes: 2", 2½", 3" and 4"
1000 lbs. thru 5000 lbs. Working Pressure

Screw by Flange Valves
Sizes: 2", 2½", 3" and 4"
1000 lbs. thru 5000 lbs. Working Pressure



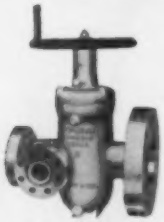
Unequal Flange Valves
Sizes: 2", 2½" 3" and 4"
1000 lbs. thru 5000 lbs. Working Pressure



Bolted Bonnet Valves
Size: 4"
10,000 lbs. Working Pressure

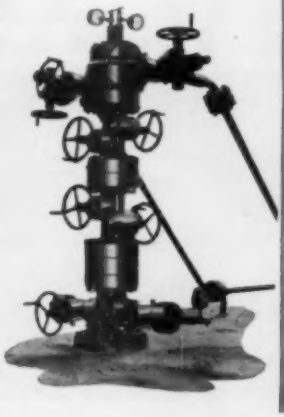
Balanced Stem Valves
Sizes: 2", 2½", 3" and 3½"
10,000 lbs. Working Pressure
Sizes: 1⅜", 1⅝", 2⅛" and 2⅜"
15,000 lbs. Working Pressure

Cross Type Valve (4" cross)
Sizes: 6" x 6" and 6" x 7"
2000 lbs. thru 5000 lbs. Working Pressure



Unequal Flange Cross Type Valves (2" cross)
Sizes: 2", 2½", 3", and 4"
2000 lbs. thru 5000 lbs. Working Pressure

Recessed Body Valves
Sizes: 1½", 1¾", 2", 2½" and 3"
2000 lbs. thru 5000 lbs. Working Pressure



Drilling Valves
Sizes: 6" x 7" and 6"
2000 lbs. thru 5000 lbs. Working Pressure

CONDUIT GATE VALVES

FOR

EVERY PRODUCTION SERVICE

A wide range of sizes . . . working pressures from 500 to 15,000 pounds . . . flange, unequal flange, screw or screw by flange end connections . . . multiple zone completion valves and cross type valves give you the *right* choice in a W-K-M Valve for every well completion job. Easy operation, DOUBLE-TIGHT SEAL, long life and positive CONTROLLED FORCE SEATING make W-K-M Valves the safest and most economical to use in the oil field.

You receive two special benefits from the parallel expanding gate feature of W-K-M Valves. When the valve is being opened or closed, the gate and segment are contracted together by a powerful spring to allow a slight clearance between them and the body seats for easy operation. After the gates have reached the opened or closed position, the gate and segment expand with CONTROLLED FORCE SEATING against both the upstream and the downstream seats.

Acid and alkali resistant Teflon† inserts in the seat rings give DOUBLE-TIGHT SEALING to control the lightest of gases or the heaviest of crudes.

All standard W-K-M Valves have full-bore through conduits without crevices or other flow obstructions to cause turbulence and pressure loss. Special reduced port valves are available which provide all the advantages of standard valves, except that the conduit is of venturi design to permit a smooth flow transition with a minimum of pressure drop.

SUPERIOR FEATURES—STANDARD ON W-K-M

• *Through-Conduit* • *Parallel Expanding Gates give CONTROLLED FORCE SEATING* • *Teflon seat inserts for DOUBLE-TIGHT SEAL** • *Two Thrust Roller Bearings* • *Pressure Seal Bonnet* • *Enclosed Packing Gland* • *Superfinished Stems* • *Fully Repairable while Installed*

Design and operating advantages, as well as sizes and dimensions of all valves are contained in W-K-M Catalog 700. Address Dept. A-1230 for your copy.

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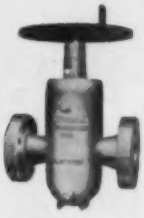
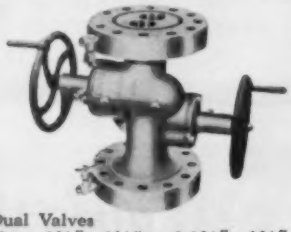
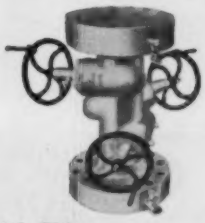
MANUFACTURERS OF W-K-M GATE VALVES · ACF LUBRICATED PLUG VALVES · KEY-KAST ALLOY STEEL PIPING FITTINGS · KEY RETURN BENDS AND FITTINGS



Reduced Port Valves
Size: 2" x 1⅝"
5000 lbs. Working Pressure



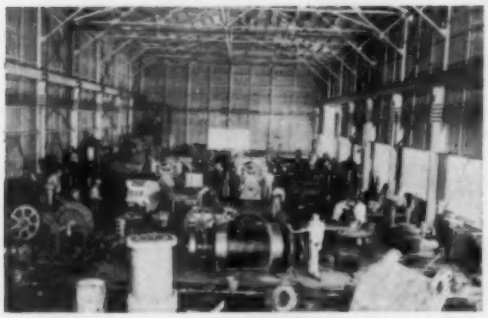
Dual Valves
Sizes: 1½" x 1½" and 1¾" x 1¾", 2" x 2", 2" x 2½", 2½" x 2½", 2½" x 3", 3" x 3"
2000 lbs. thru 5000 lbs. Working Pressure



Triple Valves
Size: 2" x 2" x 2"
2000 lbs. thru 5000 lbs. Working Pressure

a new high in prompt service . . .

from AVONDALE



For speedier customer contacts throughout the oil country . . . Avondale now has available a 265 h.p. Helio-Courier seaplane for Sales and Service coverage. This means a new high in Avondale's "prompt service" tradition. We are prepared, as always, to meet your most exacting requirements on construction and repair of oil drilling equipment. Our entire integrated facilities, including our Oil Tool Department and modern Electric Shops, are at your disposal . . . 24 hours of every day.

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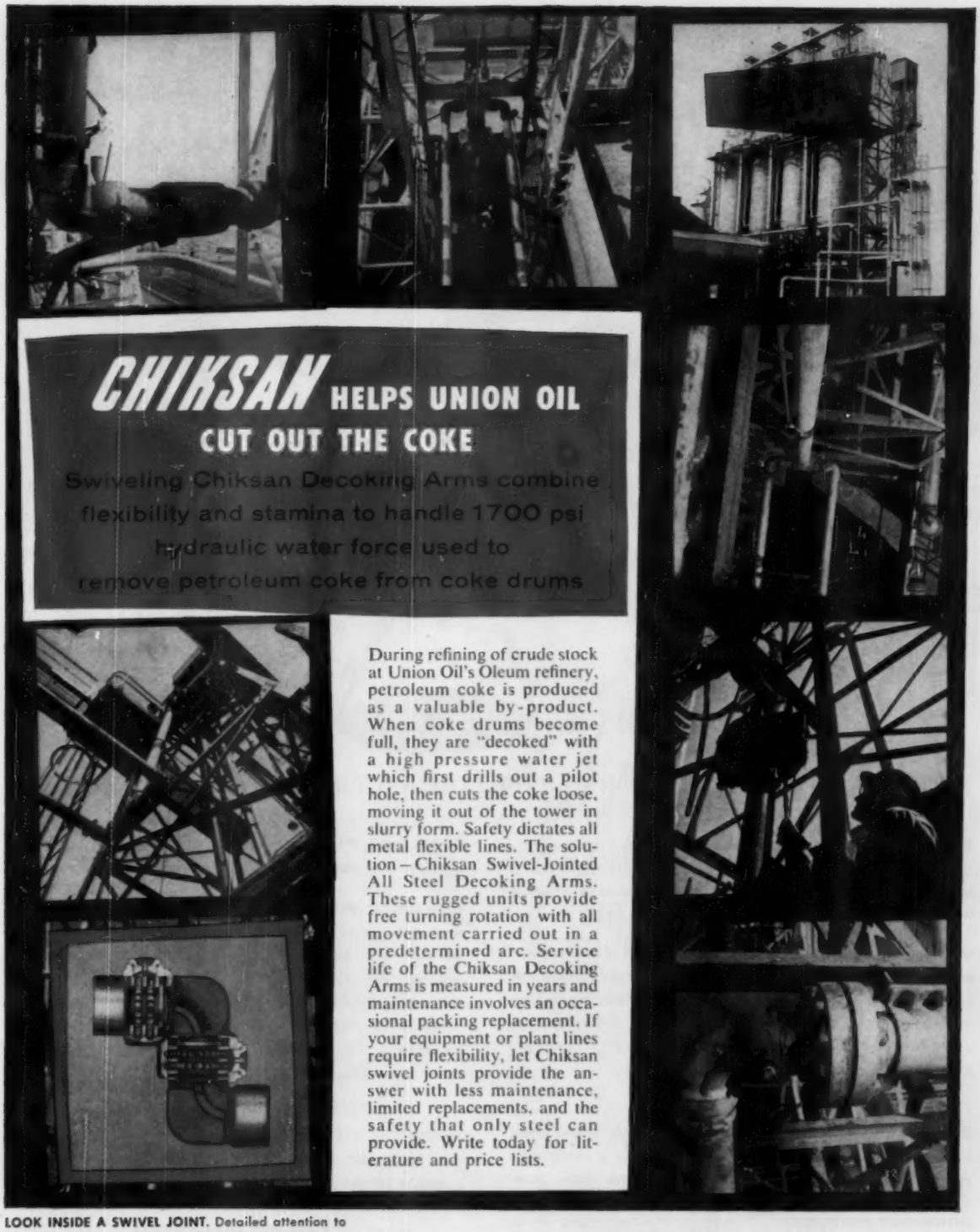

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Swiveling Chiksan Decoking Arms combine flexibility and stamina to handle 1700 psi hydraulic water force used to remove petroleum coke from coke drums

During refining of crude stock at Union Oil's Oleum refinery, petroleum coke is produced as a valuable by-product. When coke drums become full, they are "decoked" with a high pressure water jet which first drills out a pilot hole, then cuts the coke loose, moving it out of the tower in slurry form. Safety dictates all metal flexible lines. The solution—Chiksan Swivel-Jointed All Steel Decoking Arms. These rugged units provide free turning rotation with all movement carried out in a predetermined arc. Service life of the Chiksan Decoking Arms is measured in years and maintenance involves an occasional packing replacement. If your equipment or plant lines require flexibility, let Chiksan swivel joints provide the answer with less maintenance, limited replacements, and the safety that only steel can provide. Write today for literature and price lists.

LOOK INSIDE A SWIVEL JOINT. Detailed attention to detail. Precision machining and specific packing seals for specific services. These are the quality-plus features built into every Chiksan Swivel Joint.

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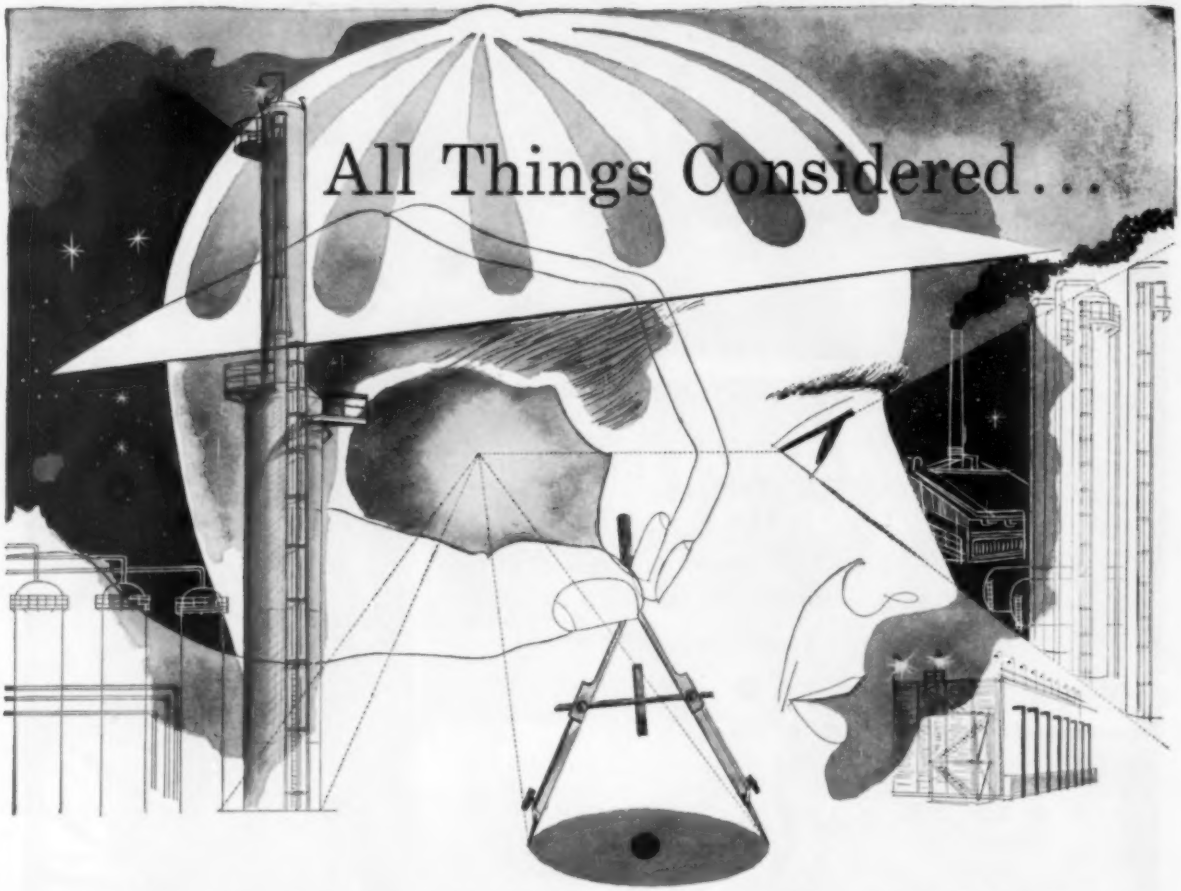

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CONSIDER THE TIME . . . When building a new plant, modernizing or expanding present facilities, time is money. Every extra day of construction means greater cost to your company.

CONSIDER PRITCHARD . . . Pritchard's Single Responsibility Contract saves valuable time by coordinating the project from engineering through final testing. Work begins on your plant before engineering drawings are completed. Pritchard teams work closely together, assuring a continuous, rapid flow of activity.

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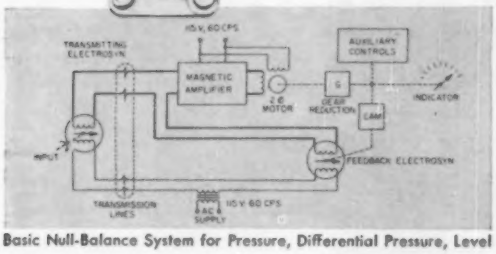
Featuring high reliability, low maintenance and flexibility of application, the ElectroSyn System can withstand a static overload of 300% of rated pressure for a 1% zero shift.

Model 501



Basic Null-Balance System for Pressure, Differential Pressure, Level

Basic system consists of signal transmitter, magnetic servo amplifier, null-balance indicator. (No electron tubes, slide wires or continuously moving parts.)

In measuring pressure the Model 501 transmitter utilizes a twisted bourdon tube as the pressure sensing element. This tube converts the pressure into shaft rotation of the ElectroSyn signal generator, a rotary differential transformer. Output from the ElectroSyn signal generator is an a-c voltage exactly proportional to the measured variable. **Write for Brochure B257**

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New ECONOMY with complete SAFETY

RECTOR UNIBOLT

Dual String Christmas Tree

The Rector Unibolt Tree is the only dual-string assembly to make use of Unibolt connections throughout, eliminating the weakness of threaded connections and the inconvenience of an all-welded hook-up. It provides two separate verticals clamped together and can be assembled and disassembled the same as a flanged tree, only quicker and easier.

UNIBOLT CONNECTORS provide high-pressure metal-to-metal seals with virtually the same positive safety factor as flanged connections.

With the new Rector Unibolt Christmas Tree assembly you get the safety of METAL-TO-METAL high-pressure seals between each connection . . . without the expensive dual master valve required in flanged trees.

Ask your Rector representative or your favorite supply store about the many advantages of this new field proven dual-string assembly.

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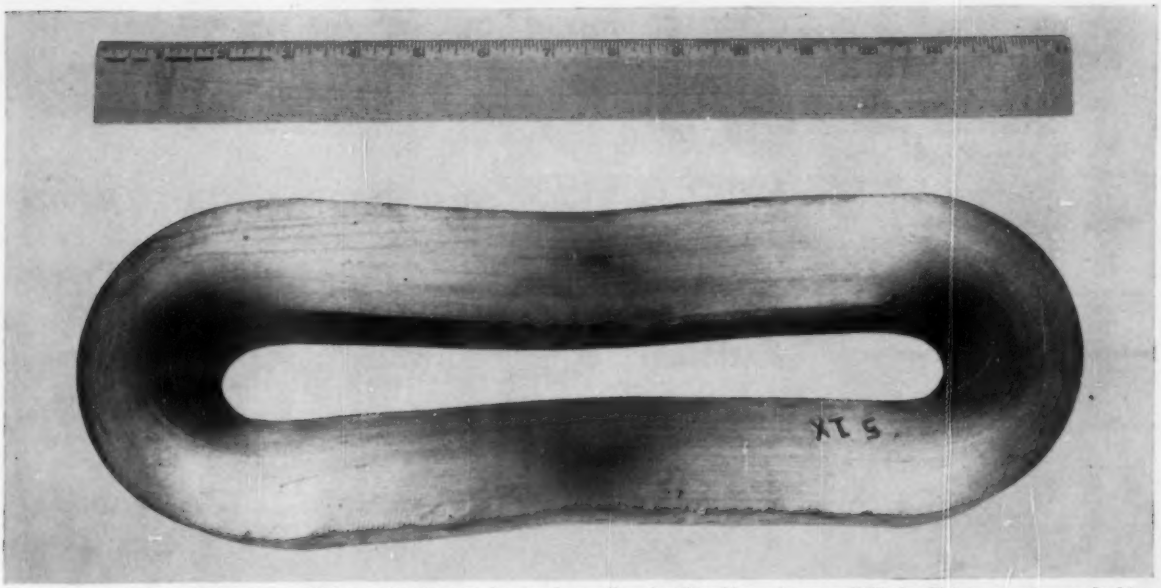

Flattening test of 10½" O.D. by 1.580" wall of 18-8 Cb (AISI 347) showing the excellent ductility of large, heavy-wall Timken high temperature steel tubing.

To get the best possible tube life per dollar: *Ask the experts!*

This month's report is on:

18-8 Cb
AISI 347

A stabilized austenitic steel with outstanding high temperature strength up to 1200° F. Recent applications have included heavy wall tubes for 1100° F. steam lines.

22 TIMKEN® STEELS FOR HIGH TEMPERATURE SERVICE

Carbon	Sicromo 2	Sicromo 5S	18-8 Ti
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	16-13-3
DM-2	2¼% Cr.-1% Mo.	Sicromo 7	25-20
Silmo	Sicromo 3	Sicromo 9M	25-12
DM	4-6% Cr.-Mo.	18-8 Stainless	
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti	18-8 Cb	

SEVERAL analyses of high-temperature steels may solve your temperature, pressure, corrosion, and oxidation problems. But to get the best life/cost ratio —the best possible tube life per dollar—there's actually only one analysis that's best for you.

To get it, ask the experts—metallurgists of The Timken Roller Bearing Company. They're recognized authorities on high-temperature steels—with more than 25 years of high-temperature steel research and experience behind them. From the 24 different analyses at their disposal, let them help you choose the *one* tube steel analysis that's best for your particular job. Whatever one you choose, you can be assured of uniform quality. That's because the Timken Company rigidly controls quality from melt shop through final tube inspection. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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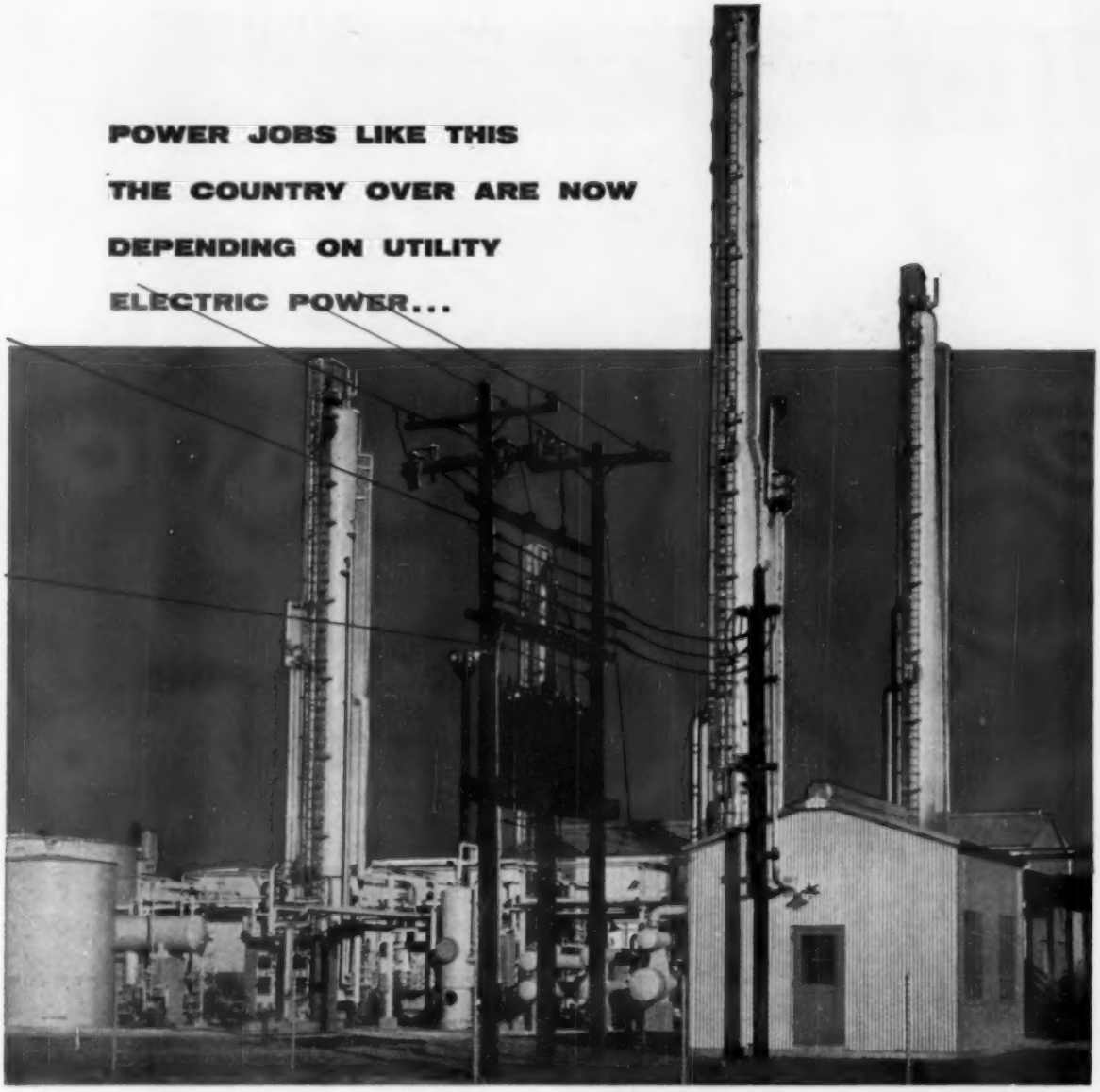
DEPENDING ON UTILITY
ELECTRIC POWER...



Progressive Management is taking a second look

One of the biggest expansions in refining operations is coming up. If you have any part in this important development don't let your company decide on power until the modern benefits of UTILITY ELECTRIC POWER have been carefully investigated. Call in the sales engineer of your Electric Service Company while your plant is in the planning stage. Convincing facts and helpful counsel are yours for the asking.

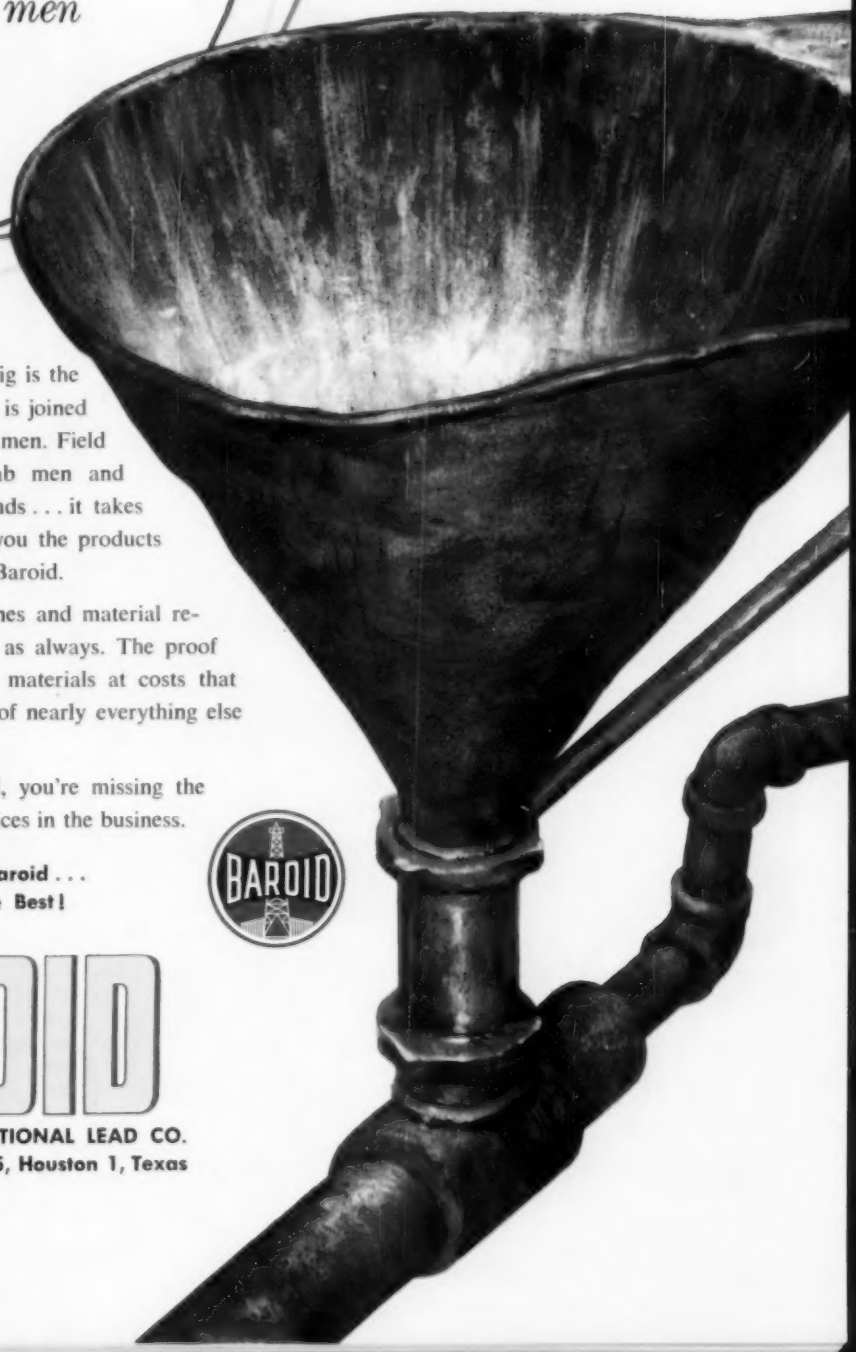
Be modern . . . Be progressive . . .
Use UTILITY ELECTRIC POWER.

PETROLEUM ELECTRIC POWER ASSOCIATION

P. O. BOX 35006 DALLAS, TEXAS

No moving parts

. . . yet its operating crew includes more than 2,000 Baroid men



The mud hopper at your rig is the point where your own crew is joined by more than 2,000 Baroid men. Field engineers and foremen, lab men and loggers, miners and millhands . . . it takes a big organization to give you the products and services you get from Baroid.

In manpower, facilities, mines and material reserves, Baroid leads today, as always. The proof is at your rig: better mud materials at costs that have risen *less* than prices of nearly everything else you use in drilling.

If you're not using Baroid, you're missing the best mud products and services in the business.

When you buy Baroid . . .
. . . you buy the Best!

BAROID

BAROID DIVISION • NATIONAL LEAD CO.
Main Office: P. O. Box 1675, Houston 1, Texas

5798

Baroid's new **SHALE BAN*** *ends shale trouble*

DRILL THICK SHALE FORMATIONS WITH LESS TROUBLE

SHALE BAN* additive makes a chemical mud that inhibits hydration and dispersion of formation clays both as shales and as clay particles in sands. This means lower mud and drilling costs—greater probability of successful drilling of long mud making shale formation—and less damage to dirty sands.

*Trademark, Baroid Division National Lead Company.

1. SHALE BAN additive reduces the build-up of drilled solids; results in less mud to condition with weight materials, chemicals and filter loss reducing agents because less mud is made.
2. SHALE BAN additive keeps the hole to gauge resulting in less mud volume to treat—more efficient cuttings removal and less cement when casing is set.
3. SHALE BAN additive reduces tendency of drill pipe to stick during salt-water flows because the shales are "pickled" by the mud filtrate and the mud is tolerant to salt-water.
4. SHALE BAN additive can result in production increases because clays do not hydrate and swell to reduce permeability. Flocculated mud particles are less likely to penetrate sand formation pores.

Specify SHALE BAN mud and get the advantages of less mud cost, lower drilling cost, less trouble and increased production. Write now for technical bulletin.

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Send me your bulletin on SHALE BAN additive.

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It's Cleaner Gas with
PEERLESS
SCRUBOSPHERES

Operation of these four 66" I.D. Scrubospheres has demonstrated their superiority over oil bath dust scrubbers. The dust removal ability of the SCRUBOSPHERE is outstanding because it utilizes wetted surfaces for dust collection which are more closely spaced than in conventional equipment.

Operation of these Peerless units has also proven their superiority with respect to minimum oil loss, because oil is periodically removed from the Scrubospheres whereas **it must be periodically added to other scrubbers** in the same plant operating under comparable conditions.

Let your Peerless Representative give you full details.

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Representatives in All Principal Cities

PEERLESS MFG. CO.
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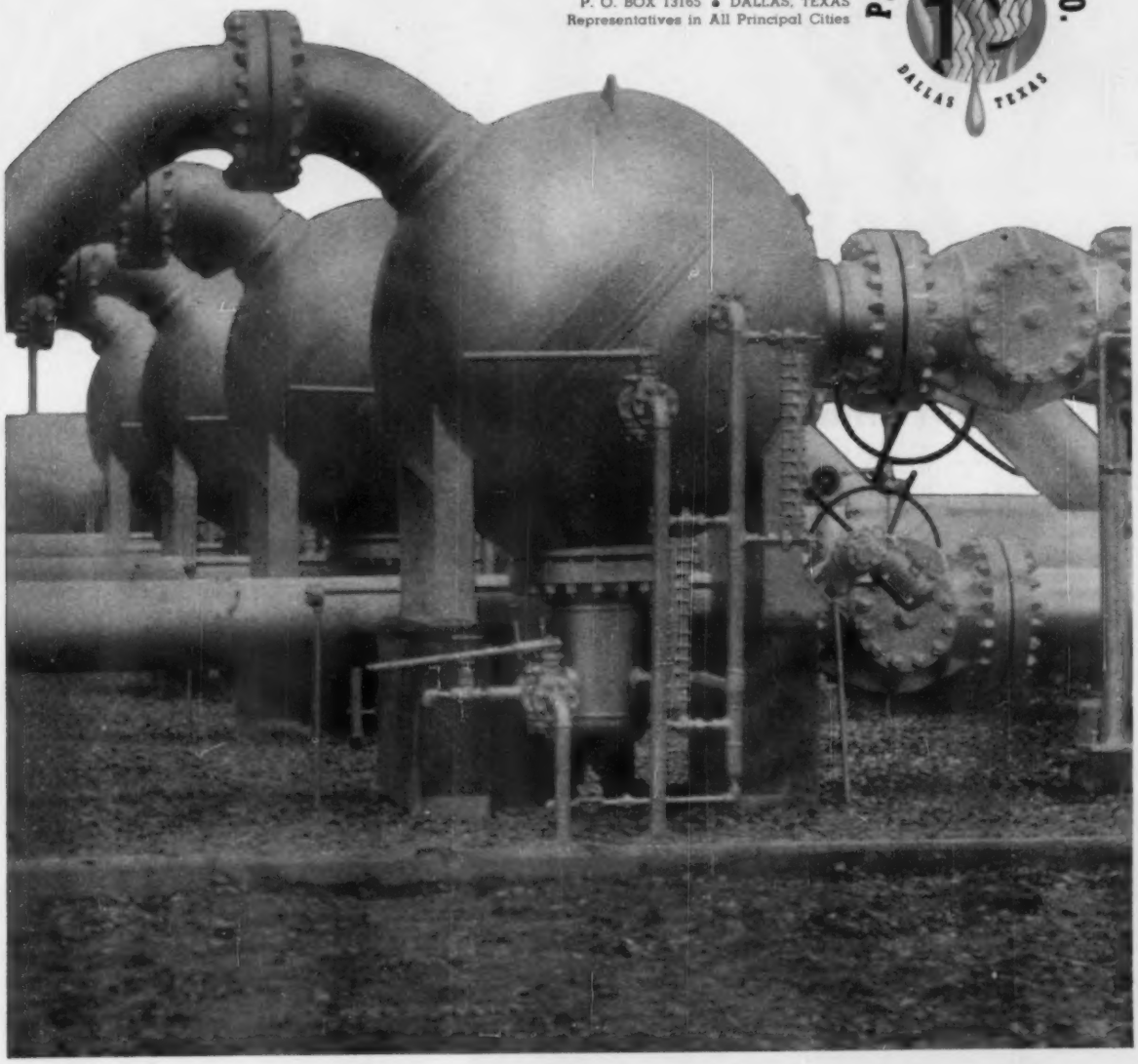
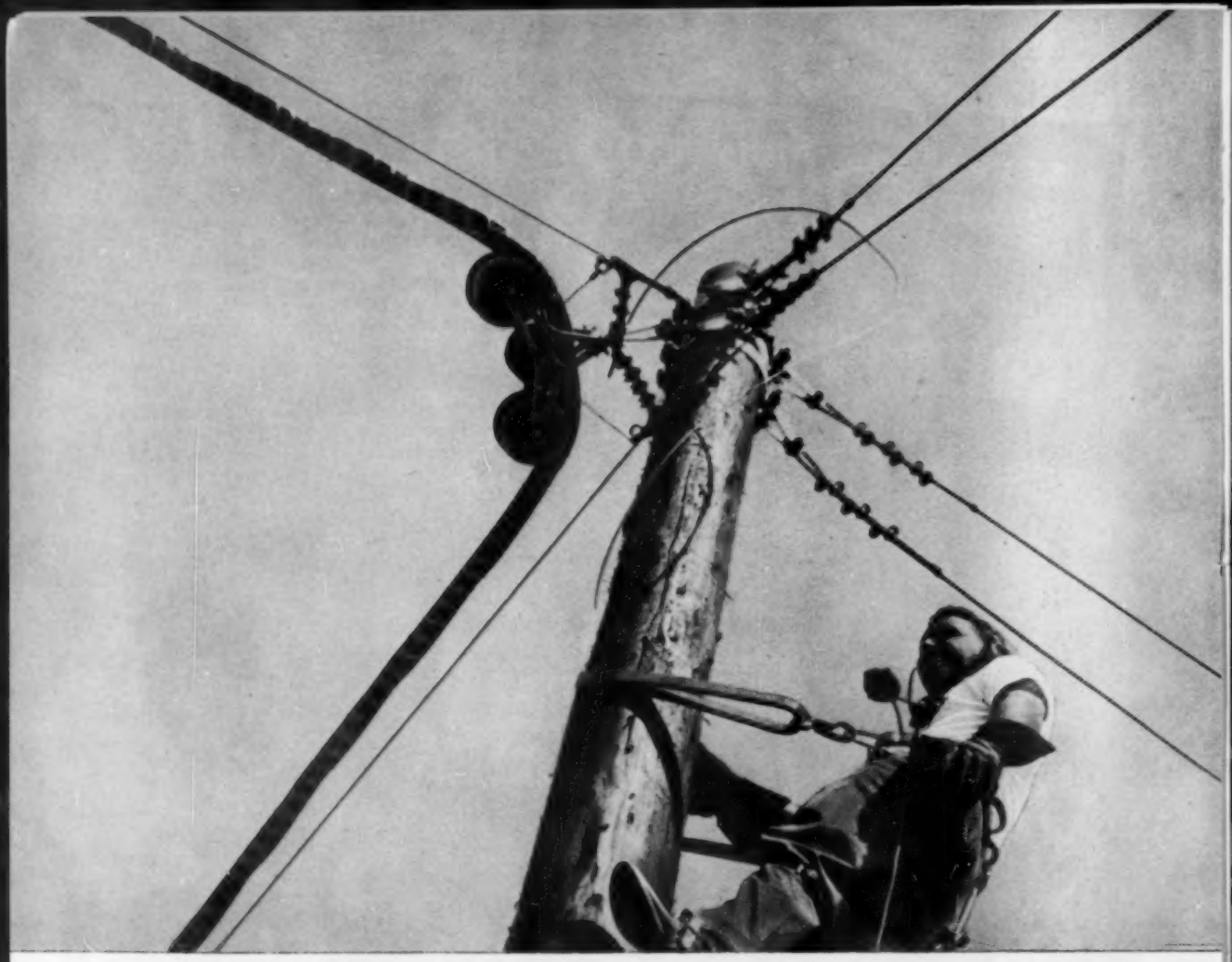




AERIAL CABLE is installed without crossarms, enabling plant to add to electrical system with minimum labor cost and delay.

Three won't make a crowd—with Anaconda Aerial Cable

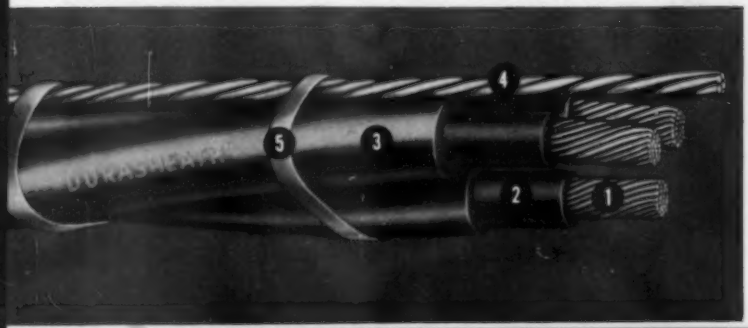
Crowded poles . . . new power lines needed! This industrial plant solved the problem neatly and at low cost with Anaconda Aerial Cable.

Anaconda Aerial Cable is fast, easy to install — no special ducts, crossarms or insulators are needed. And one cable takes the place of multiple wires!

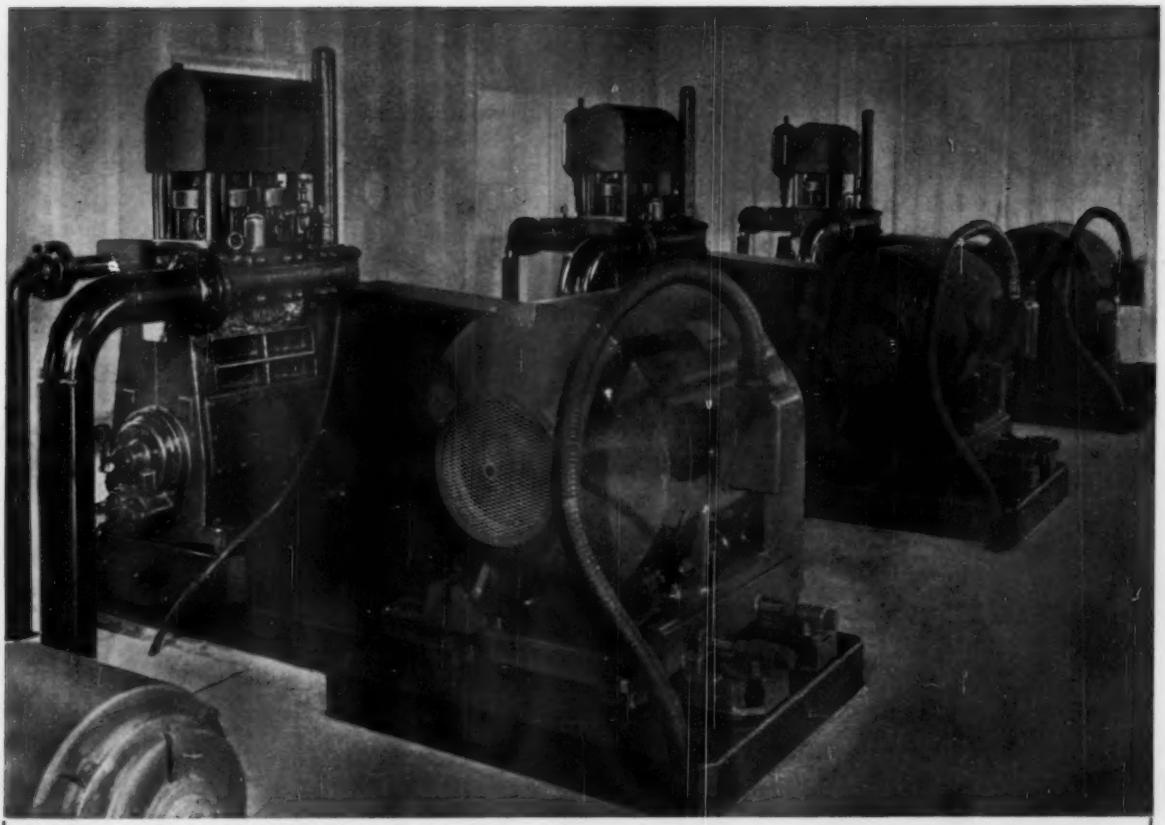
Even where space is not a factor, you may find Anaconda Aerial Cable far more economical than other conductors in the long run. Aerial cable shrugs off wind, rain, snow and ice — withstands falling branches — minimizes maintenance and repairs; has unsurpassed dependability.

TODAY'S FINEST AERIAL CABLE! Type AB butyl insulation gives Anaconda Aerial Cable top resistance to ozone, heat and moisture. The Man from Anaconda or your Anaconda distributor can give you full information. Write or call today. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 87330C

SEE THE MAN FROM ANACONDA® FOR AERIAL CABLE



1. Conductors—copper or aluminum
2. Ozone-, moisture- and heat-resistant butyl insulation
3. Neoprene weather-resistant jacket
4. Messenger
5. Binder tape



FIELD REPORT

FLOOD: Loudon-System No. 2

PUMPS: 24 Aldrich Direct Flow Triplex

PUMPS INSTALLED: April 1953

EXPERIENCE TO DATE:

Carter Oil Company reports..."Pumps are in continuous operation. Very satisfactory service — very low operating cost...equal to, or less than, any other type pump used similarly. Excellent service from area representatives."

Field parts stock available in Carmi, Ill., Charleston, W. Va., Houston, Los Angeles, Odessa and Tulsa. For further information, write the Aldrich Pump Company, 9 Gordon Street, Allentown, Pa.

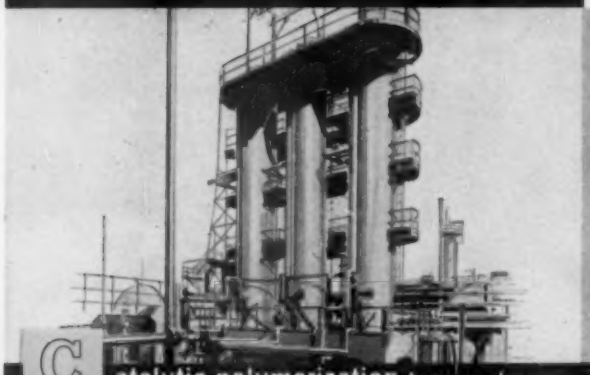
the toughest pumping problems go to ALDRICH

Somewhere on these pages is a

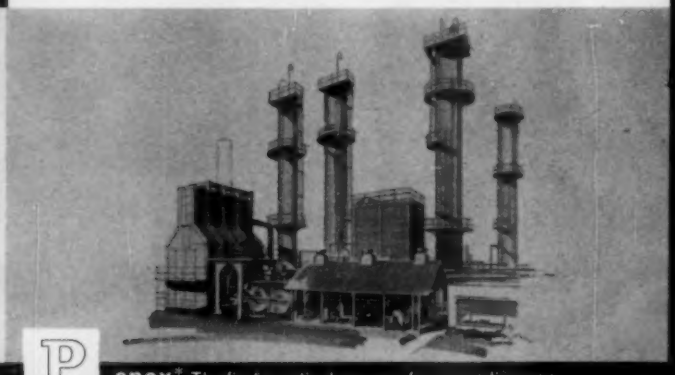
UOP

answer to most every petroleum processing problem.

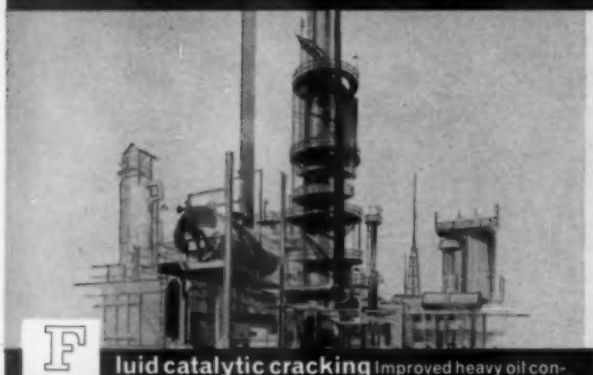
Working out the solution to a processing problem can be a pretty tough assignment for any refiner. But this is a UOP specialty and it's highly probable that UOP can come up with the right answer. Perhaps, we don't have all the answers right on tap but our more than 40 years of research and engineering development in oil refining technology is pretty good assurance that we can work them out. Quite possibly you will find



Catalytic polymerization A process for converting propylene and butylenes to high grade gasolines



Penex® The first practical process for upgrading pentane and hexane fractions



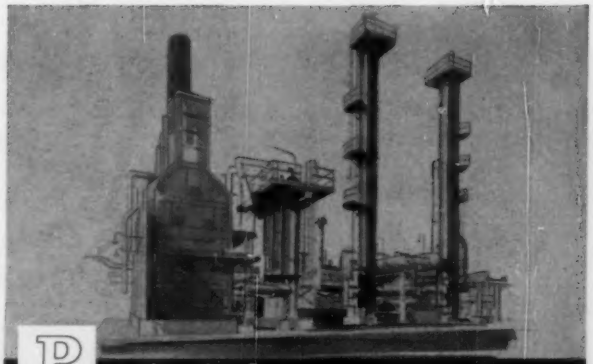
Fluid catalytic cracking Improved heavy oil conversion process for higher yields and octane numbers

Vacuum distillation and visbreaking Efficient, economical processes for feed preparation

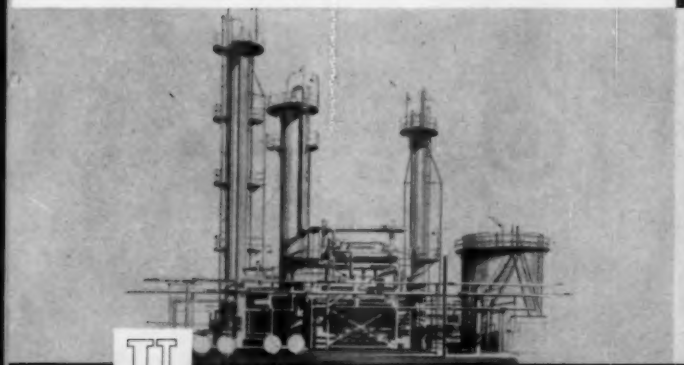
Low pressure coking A process that adds market flexibility

Rexforming® The ideal process to insure your top octane position

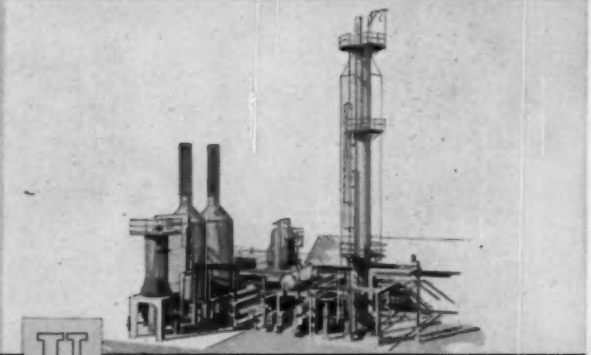
the solution among the processes shown here. For these represent only some of the refining and petrochemical processes UOP makes available to all refiners, anywhere. If you would like to know more about all the refining and petrochemical processes available from UOP we'll be glad to send you our handsome new 36 page brochure describing these more fully. Just drop us a line on your company letterhead.



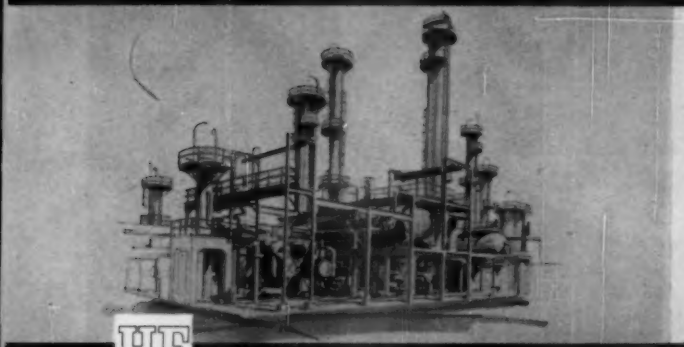
P latforming® The most popular process for upgrading gasolines



U nisol® A finishing process without octane degradation

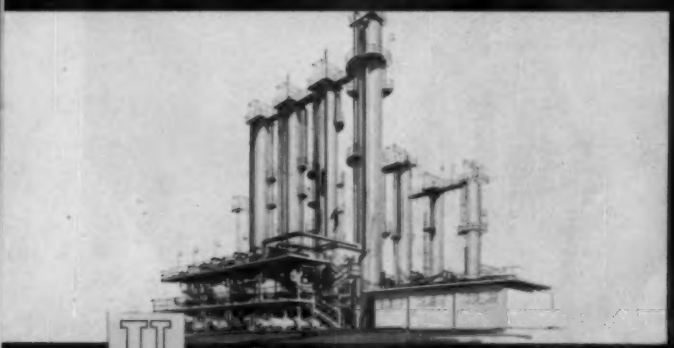


U nifining® A modern process for completely purifying petroleum distillates



HF Alkylation A catalytic process for producing alkylate

T hermal cracking An improved design of a basic refining process



U dex® A process for separating gasoline into high and low octane fractions

UOP® UNIVERSAL OIL PRODUCTS COMPANY

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—CUTS TOOL COSTS

The design and production of Pressure Vessels may be greatly facilitated by using dished and flanged ends spun by Harveys on the Rotarpress. They combine semi-ellipsoidal form with large knuckle radius. A substantial reduction in plate thickness can be effected, and in most cases tool costs are eliminated.

'Rotarprest' Ends for Pressure Vessels

can be supplied in Mild, Alloy and Clad Steels and Non-Ferrous Metals. The capacity of the Rotarpress ranges from 5 to 15 feet diameter, and ⅛" to 4" thickness. Knuckle radii and depth may be varied to meet individual requirements.

Please ask for List No. OG-965 giving full range of sizes.

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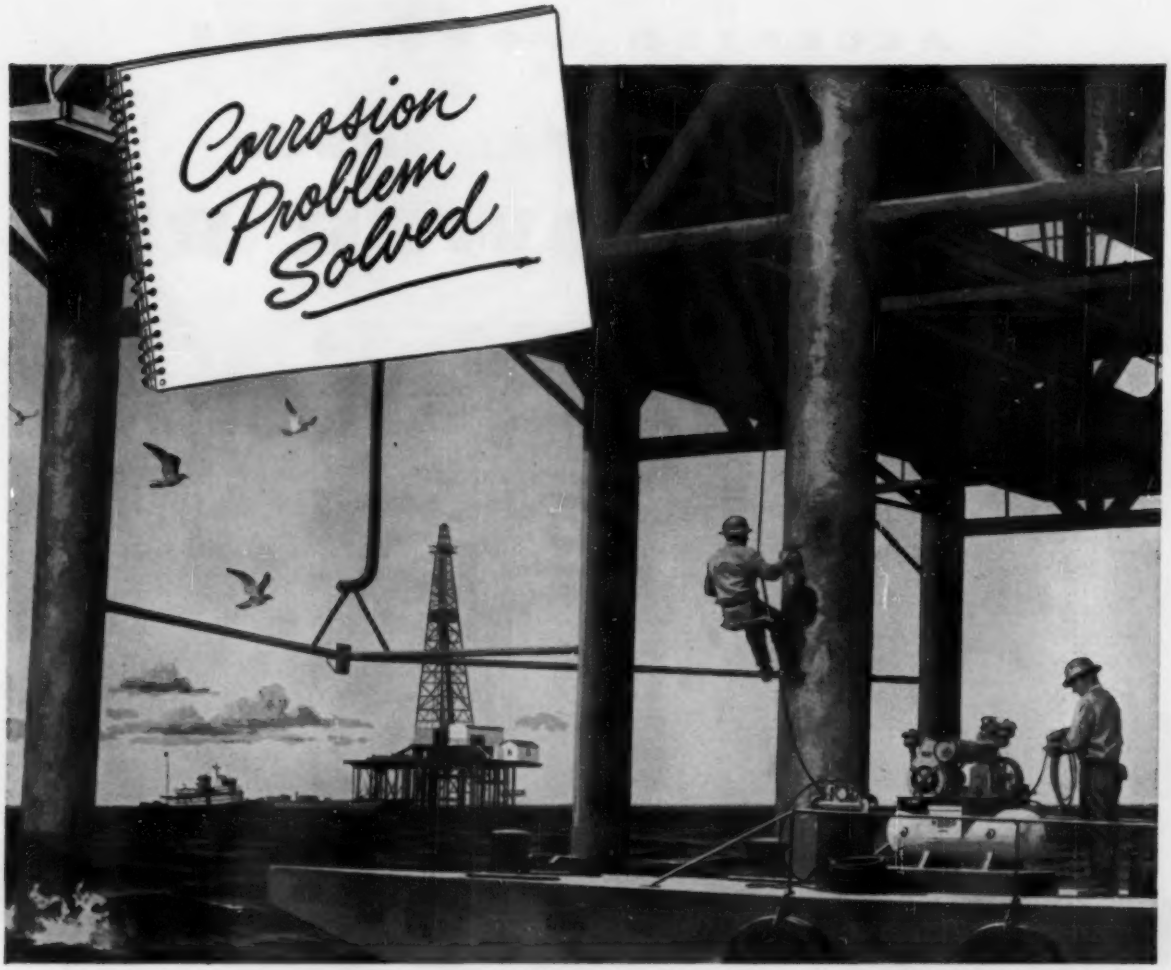


Even offshore, where corrosion is severe, **Humble's coatings** give effective protection!

On costly offshore drilling platforms, Humble's protective coatings have *proved* their ability to resist the powerful corrosive action of salt water splash, spray and vapor. There's a Humble protective coating for every surface from the splash-zone to the crown block, including the working platform and structures on the platform.

For the platform itself, excellent results have been obtained by using a six-coat vinyl system, including one vinyl mastic coat, to a total dry film thickness of from 14 to 16 mils. Humble's vinyl protective coatings produce a tough, flexible film that gives remarkable resistance to weathering.

Humble Oil & Refining Company

HUMBLE

At your request, one of Humble's trained engineers will make a thorough study of your needs and give you complete protective coating recommendations. For more information on this service, and on Humble's complete line of protective coatings, call your Humble salesman, or phone or write:

Technical Service
Sales Department
Humble Oil & Refining Company
P O Box 2180
Houston 1, Texas

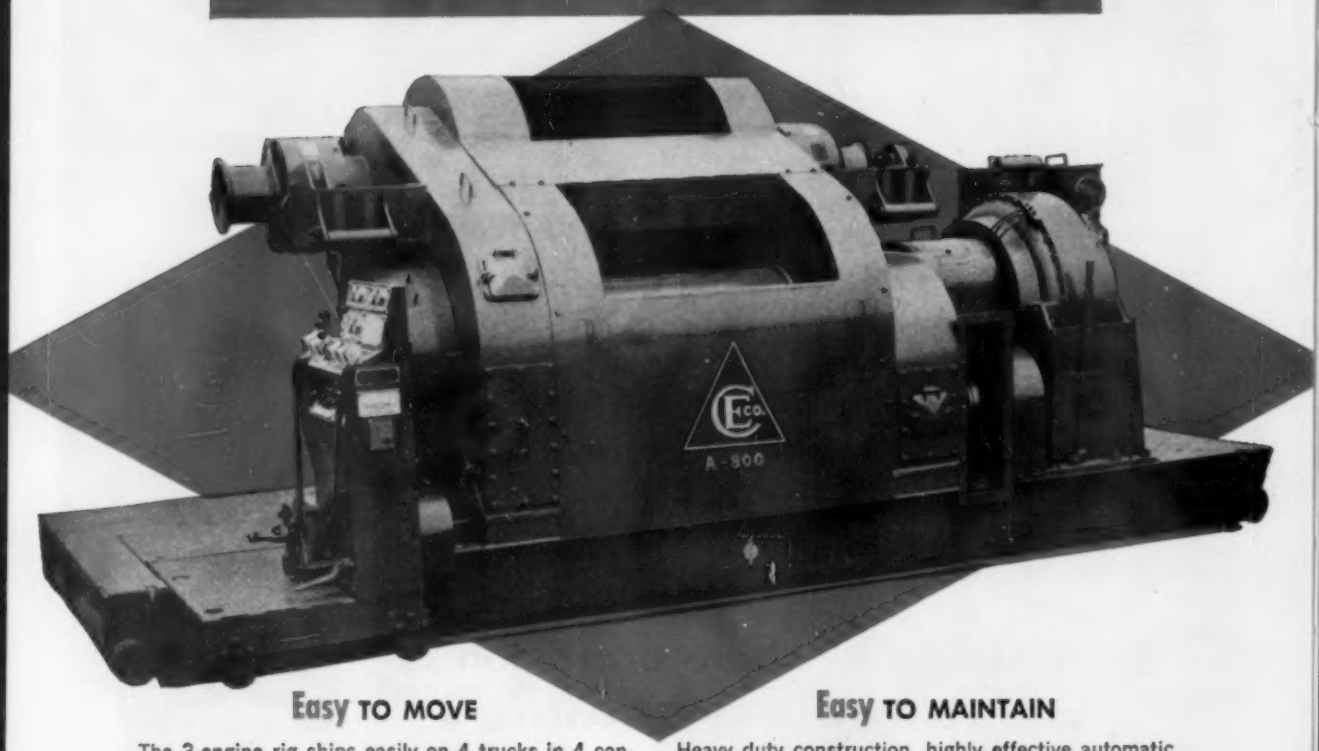
ACCEPTED WORLDWIDE

CONTINENTAL-EMSCO

A-800 POWER RIG

(800-1100 H.P.)

has been thoroughly field proven under drilling conditions the world over!



Easy TO MOVE

The 3-engine rig ships easily on 4 trucks in 4 convenient packages. Minimum of tear-down and rig-up time.

Easy TO MAINTAIN

Heavy duty construction, highly effective automatic lubrication, simple practical design insure minimum low-cost maintenance. Parts are readily accessible.

Easy TO LIKE

For medium and deep wells, the A-800 does its job so well and is so easy to operate, maintain and move, that it's a favorite already with drillers everywhere.

Easy TO OPERATE

Greatly improved brake system, including rim cooling, new friction-compounding clutch, control console, and many other new features make this rig simple and easy to operate.

For complete information on the rugged Continental-Emsco A-800 Rig, call Continental-Emsco today.

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Serving the Oil and Gas Industries ... Worldwide

R704

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LeTOURNEAU TRANSPORTER leaves highways far behind . . . moves boxcar-size loads over rough trails, rocks, mud and sand.

It takes traction to move 30 tons cross country, and that's what the LeTourneau Transporter delivers. Infinitely controllable Electric Power is supplied to each wheel through its own motor and gear reduction. Extra-wide, low-pressure tires provide a big compaction area . . . stay on top of soft ground and exploit every ounce of tractive power available from the diesel-electric power plant.

The combination of big tires and individual wheel drive moves heavy cargo economically and efficiently in areas where other types of vehicles can't do the job. Other features: No-wear, electric braking . . . Positive, switch-controlled, powered steering . . . Automatic proportioning of power to wheels with best traction.

If your problem is hauling heavy cargo cross country, a LeTourneau Transporter may be the answer. Send us a statement of your requirements and a description of the terrain you must cross. A Transporter will be recommended only after an analysis indicates that it may be profitably used.

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A fine construction job has a lot of eye appeal. At Procon we're pretty proud of the way our finished projects look. The most satisfaction, though, is in knowing that behind the trim, functional beauty we've put the soundness of design, the careful planning, the quality of construction to fulfill the most exacting operational requirements.

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PROCON

Hydraulic Torque Converter Drive
Weight — 78,250-lb tractor and side boom with full counterweight
127,000-lb lifting capacity at 4-ft overhang

Here the two HD-21's are lowering the heavy concrete-weighted pipe into a trench at the river bank. Outstanding stability of tractor plus quick, easy control of side boom and counterweights, permits booming out big loads smoothly, safely.

HD-21's handle the big lift on a Trans-Canadian river crossing

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

Two Allis-Chalmers HD-21 tractors with Tractomotive side booms are handling the big lifts for Marine Pipeline and Dredging Ltd. on the Red River crossing for Trans-Canada Pipe Lines Ltd. The job involves handling 2,017 ft of 34-in. dia. concrete-weighted pipe weighing 1,200 lb per foot. The two HD-21's lift section by section of pipe and travel with it while a machine on the opposite bank pulls the pipe across the river.

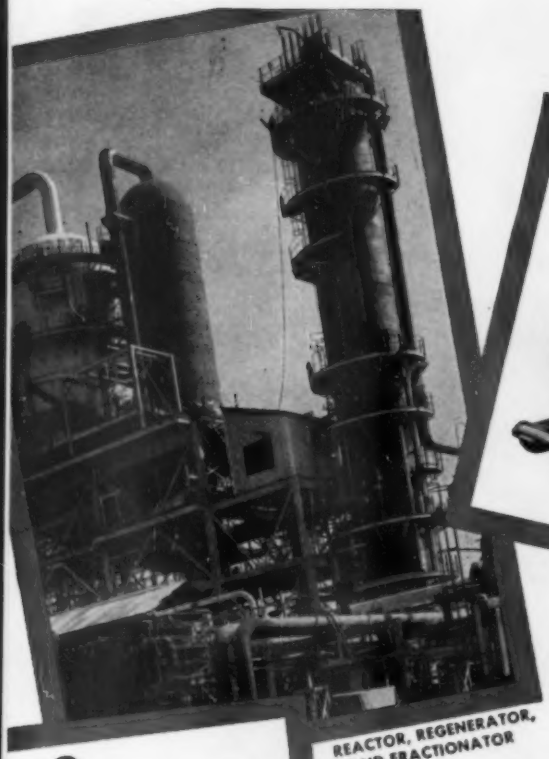
Marine Pipeline President, Glen Kennedy, states, "These HD-21's not only lift the big loads, they can run with them, too. They've really got the capacity and balance to handle the heavy pipe."

The tractor-side boom units, together with other spread equipment, are working a 70-hour week on this job. Operators particularly like the way the HD-21 handles under heavy loads and the easy, positive control of the side boom.

Allis-Chalmers-Tractomotive offers three tractor side boom sizes to fit your pipe-line requirements. Choose the most modern pipe-line equipment available today — see your Allis-Chalmers construction machinery dealer.

TRACTOMOTIVE CORPORATION, DEERFIELD, ILLINOIS

TRACTOMOTIVE



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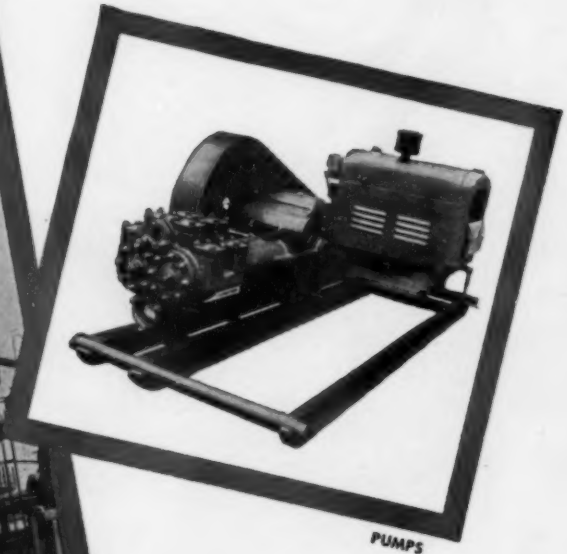
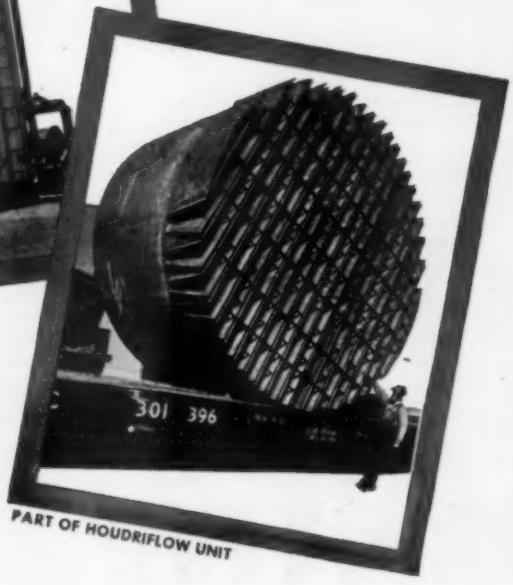


PUMPS

TREATER UNITS



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For all types of platework and fabricated steel used in refinery or field operations, remember the name DOMINION BRIDGE — it is your assurance of long experience, the most modern techniques and a reputation for unsurpassed workmanship.

Some examples of our work are shown on this page. For complete information, write for illustrated booklet "Platework for every industry", Publication No. PNN-100.

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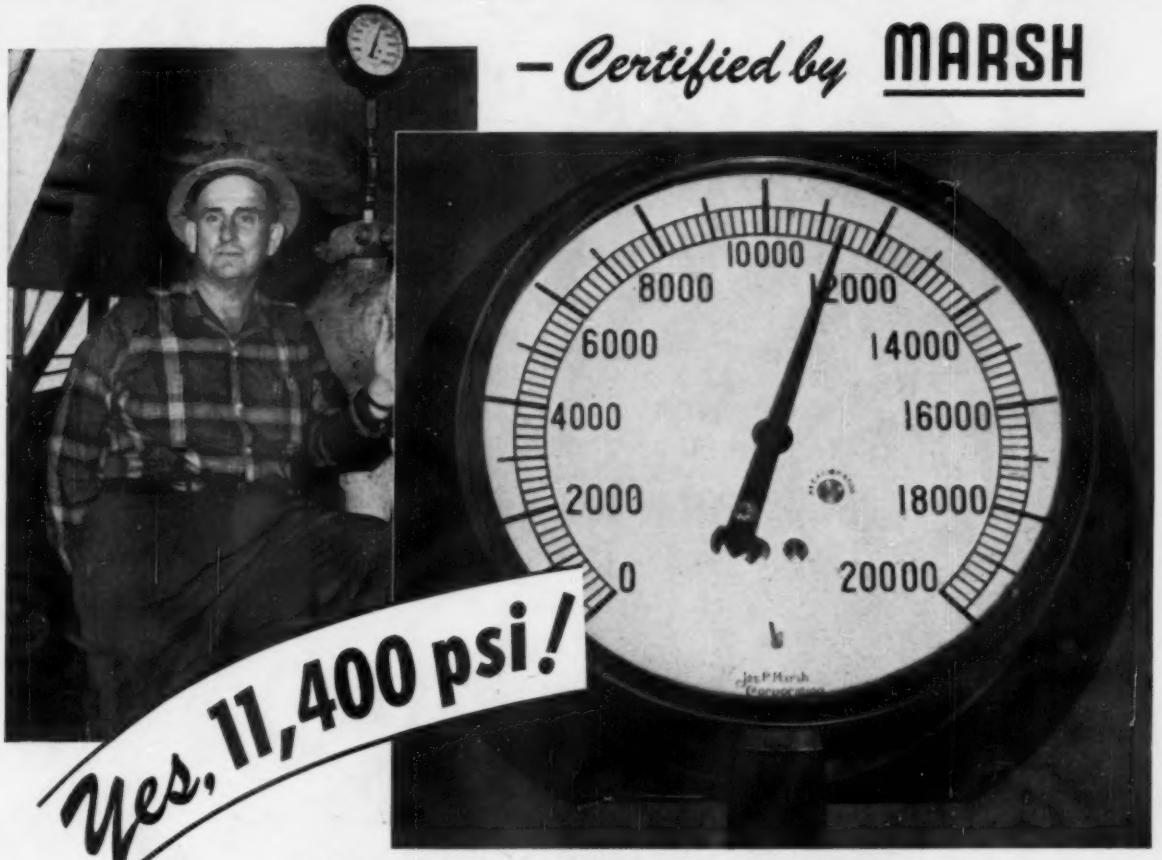
Dominion Bridge

HIGHEST WELL PRESSURE EVER!

—Certified by MARSH



Yes, 11,400 psi!

This was oil country drama at its best: bringing in the "2 Elue Roach" well in Union Oil & Gas Corporation's spectacular Lake Arthur Field at Jefferson Davis Parrish, Louisiana. The Marsh Gauge climbed to 11,400 psi; later reached 11,600 psi—highest shut-in tubing head pressure ever registered by an oil well, and by a good margin.

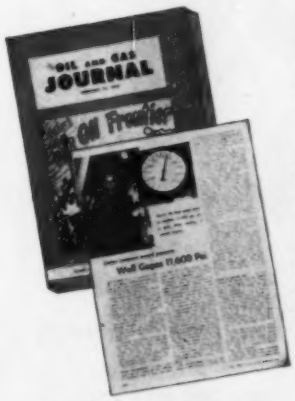
Only a few years ago oil companies were refusing to complete wells that threatened pressures of even 10,000 psi. But stronger casings, and techniques developed by Union in dealing with ever higher pressures in the Lake Arthur Field, had made "2 Elue Roach" a producing reality.

It took a lot of doing—a lot of programing and qualifying of materials—to bring in the Roach Well and the new era it foretells. So it is not surprising to see a Marsh Gauge at the top of the Christmas Tree.

Yes, wherever oil flows Marsh is at the top of the list. In the Mastergauge everything that can contribute to gauge accuracy and dependability has been brought to a higher stage of development:

- —One-piece leak-proof construction of socket, tube and tip by the exclusive Marsh "Conoweld" process.
- —Sturdy "Marshalloy" case of boiler-plate thickness steel; copper clad inside and out.
- —Precision movement with unduplicated plus features like the "coined" sector gear.
- —Stainless tubes and sockets available for any corrosive service.
- —Finally, the famous Marsh "Recalibrator" to keep the gauge always accurate.

Ask for new catalog covering Marsh instruments.



An interesting account of the method of completing the "2 Elue Roach" will be found in the February 11 issue of Oil & Gas Journal. Depth of well is 15,461 ft. Well tested 190 bbl. of condensate and 6,375,000 cu. ft. of gas daily.

MARSH INSTRUMENT CO. *Sales Affiliate of Jas. P. Marsh Corp.* **Dept. L, Skokie, Ill.**
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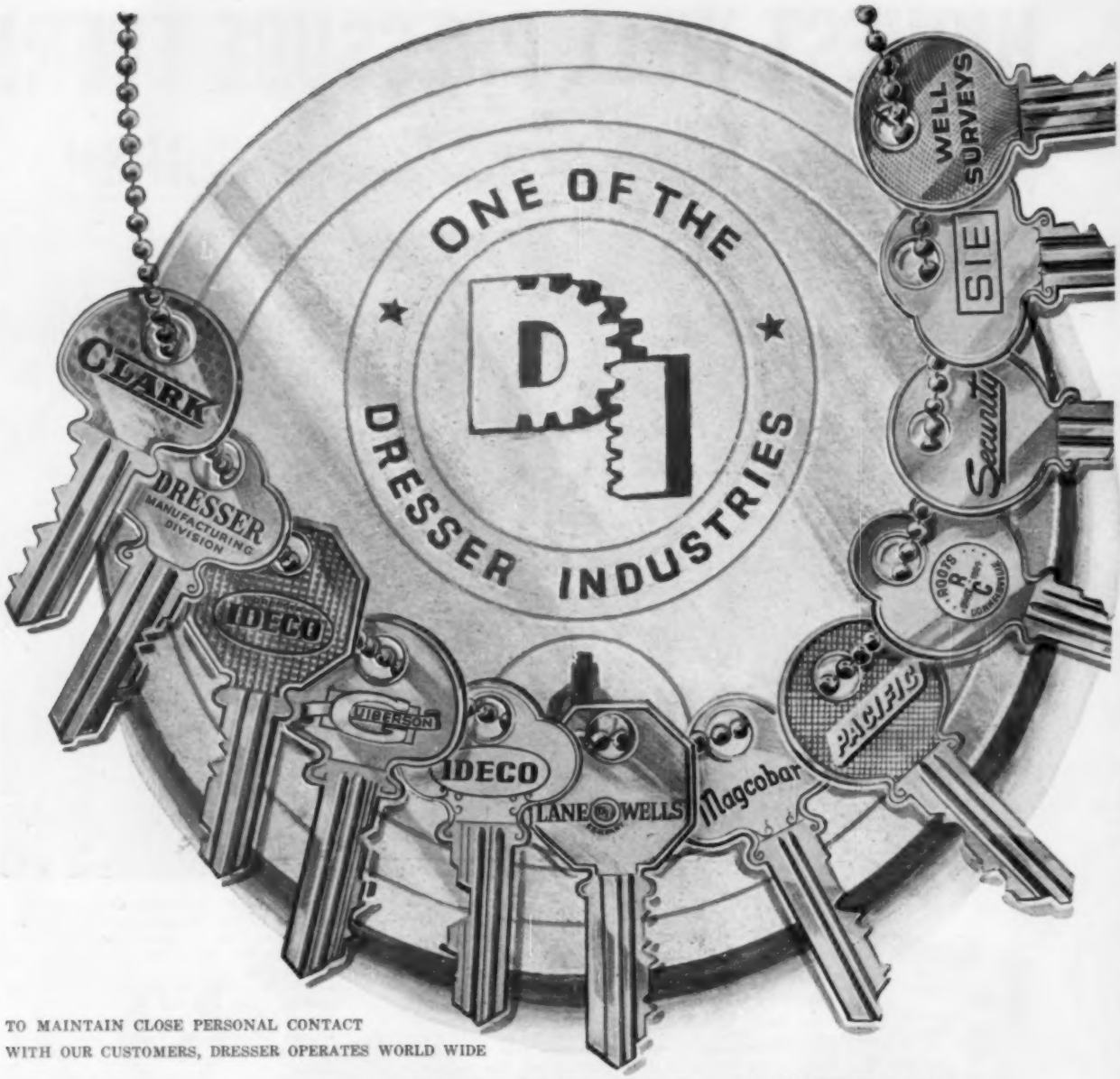

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"One of the Dresser Industries" is a well known phrase identifying the family relationship of 12 great Dresser companies which supply equipment and technical services to the oil, gas, chemical, electronic and other industries.

Each Dresser company is independently managed for maximum efficiency. Each possesses global experience, engineering talent and modern manufacturing facilities keyed to the highly technical needs of the industries it serves. Linked by common ownership, Dresser companies can be quickly mobilized to meet special conditions calling for specialized research, engineering or production facilities. This coordinated teamwork is known as Dresser *plus* +service. It's an *extra* value provided promptly by men with imagination. The Dresser *plus* + is your positive assurance of superior equipment and technical services — the standard of comparison the world over.

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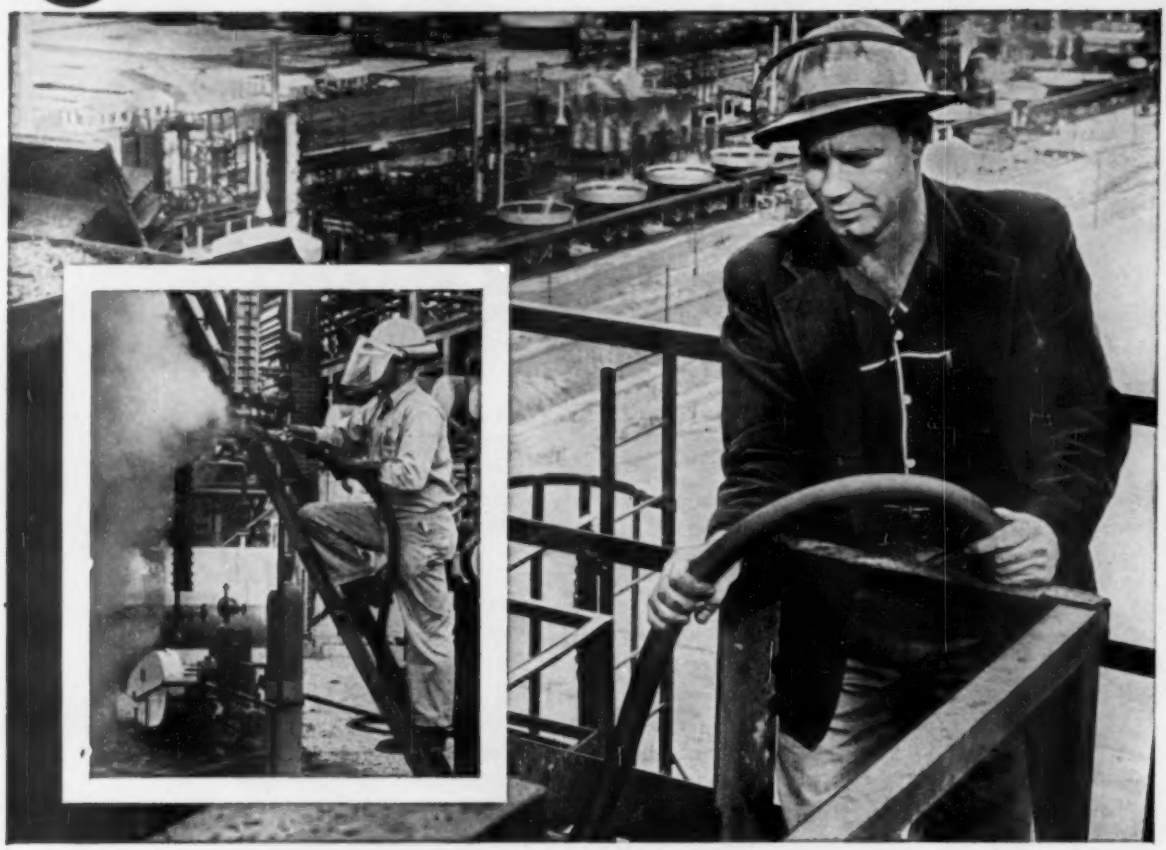
MATCHLESS STEAM HOSE



"U. S. Matchless #5 does 5 different jobs,"

says refinery division superintendent

"It always passes our strictest lab tests."

A mechanical division superintendent of a leading Midwestern refinery says:

"U.S. Matchless Steam Hose always passes our central maintenance department tests, and we've always had good experience with it. The neoprene cover is oil-resistant. The hose is highly flexible and light in weight. Asbestos ply, under the cover, conserves heat. Wire braid preserves static ground."

This great "U.S." hose is serving many industries in many ways. It is obtainable at selected "U.S." distributors, at any of the 28 "U.S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

Uses in refinery for U.S. Matchless® #5 Hose:

- As a firefighting hose, for safety-checking atop the 235-ft. cracking unit (see picture above).
- In propane tank, to thaw bottom of gauge glass in cold weather (see inset picture above).
- In pump room of cracking unit, as a steaming line to get gas traces out of the unit.
- On propane transfer line, to prevent orifice from freezing in cold weather.
- Enables construction crews to run temporary steam lines more cheaply and quickly than using pipe.

Mechanical Goods Division

United States Rubber

SAVE 2 WAYS WITH

MARTIN RUBBER GUIDE CAGES

1. GREATER PRODUCING PROFITS *because:*

Martin Cages last much longer. The oil-proof rubber guides do the trick, by absorbing the ball peen hammer action of the hard balls. They also have superior resistance to sand abrasion. And they can be replaced.

2. GREATER PRODUCING PROFITS *because:*

Ball & Seat life is usually doubled, on the average. With the rubber guides, there is much less chattering, chipping and pitting. Ball falls true on seat. Such improvement in Ball & Seat life eliminates a lot of pulling expense.

In the last year alone, new users of Martin Cages have increased by 85%. The word is getting around. More and more economy-minded producers are learning about the advantages of the Martin Cages! . . . Manufactured in open and closed types . . . all diameters and styles. Write for John Martin Catalog No. 4 today. *Martin Cages are available through all supply stores.*

JOHN N. MARTIN

Manufacturer

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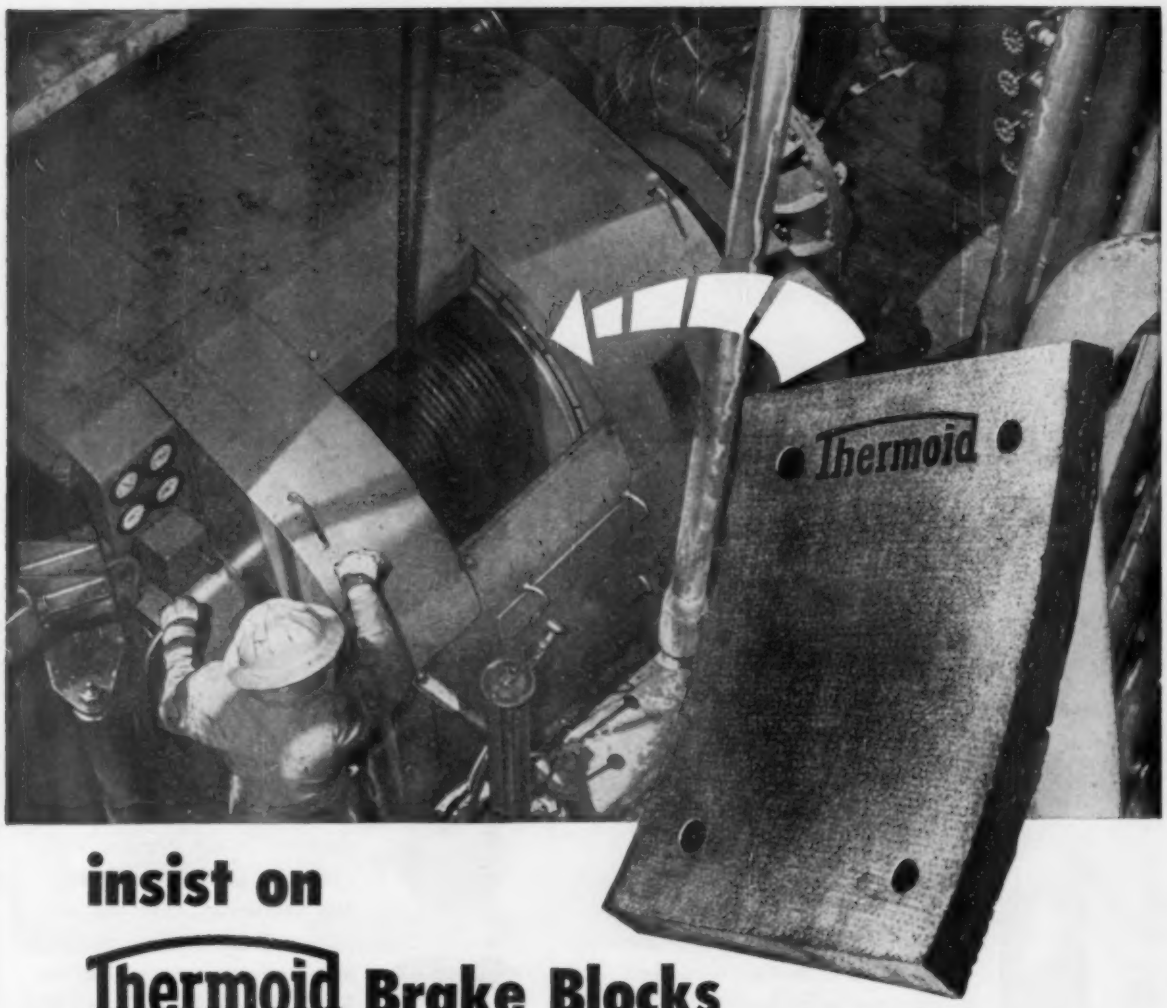

insist on Thermoid Brake Blocks for smooth, positive braking action

Super tough, woven Thermoid Brake Blocks have what it takes to operate day after day, 24 hours a day with uniform friction, extra safety and freedom from wear. They withstand highest operating temperatures without crumbling, or loss of shape.

Special resins used in Thermoid Brake Blocks prevent bleeding—leave no residue on drums. The Thermoid split-type sleeve prevents chucking. And because the braking surface is pre-ground, no "running in" is necessary. All these features add up to *less down time . . . lower maintenance costs!*

That's why Thermoid Brake Blocks are the choice of leading original equipment manufacturers and drilling contractors. It will pay you to insist on Thermoid.

For rugged oil field service, always specify Thermoid Powerflex Rotary Hose and Powerflex hi-capacity V-Belts.

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Thermoid Company
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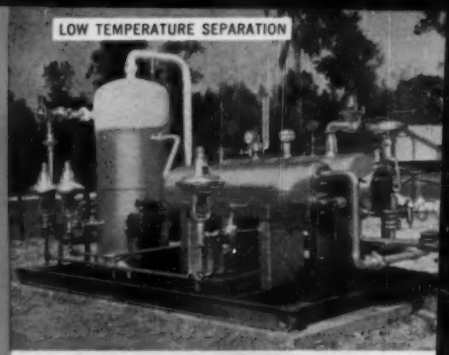
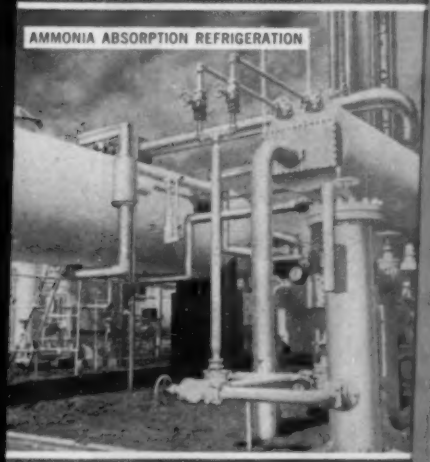


BS&B RESEARCH SHOWS THE WAY



• To Better Equipment For Oilfield Production, Gas Processing... And Full Lease Automation!

Beginning with the manufacture of wooden tanks for gauging and storage back in 1893, BS&B for 64 years has served the equipment needs of oilfield production men wherever crude oil was being produced.

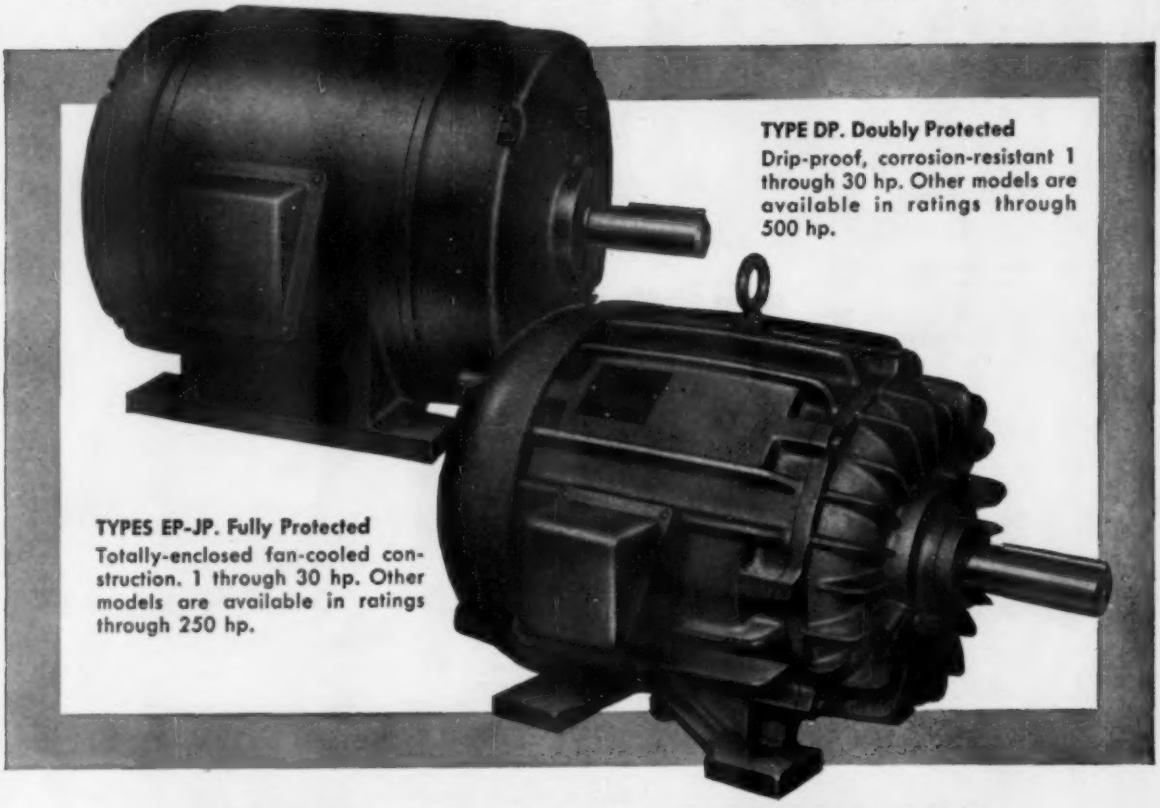
As changing times have called for better and more *specialized* equipment to do a more comprehensive field production job, BS&B has taken the lead in the development of new and better equipment to meet these requirements.

Two recent examples are the introduction of BS&B *"Phanto-Matic" Lease Systems* which provide full lease automation from the wellhead to the pipeline, and the BS&B *Ammonia Absorption Refrigeration System* which utilizes power from natural gas on the lease to produce refrigeration temperatures below 0° F. Both were developed at BS&B's modern research and development laboratory facilities, unique in the industry.

BS&B is dedicated to providing the industry with the finest oilfield production equipment, commensurate with the technology of the times.

BLACK, SIVALLS & BRYSON, INC.

Oilfield Equipment Division, Dept. 1-A12B
P. O. Box 1714 Oklahoma City, Okla.


TYPE DP. Doubly Protected
Drip-proof, corrosion-resistant 1 through 30 hp. Other models are available in ratings through 500 hp.
TYPES EP-JP. Fully Protected
Totally-enclosed fan-cooled construction. 1 through 30 hp. Other models are available in ratings through 250 hp.

PRODUCTION STAYS UP

when you power equipment with these Wagner Motors

Production is maintained when motor down-time is curtailed. To meet the petroleum industry's demands for more dependable production, Wagner has designed these polyphase motors with *extra* protection that cuts time-out for motor maintenance to a minimum.

These motors pack more power in less space—1 through 30 horsepower in NEMA frame sizes 182 through 326 U.

EXTRA PROTECTION—Type DP is doubly protected by a rugged corrosion-resistant cast iron frame and by completely drip-proof enclosures.

Types EP and JP are totally enclosed against dust, grit, fumes or moisture—protected against corrosion by cast iron frames. Type JP is explosion proof as well.

COOL RUNNING—Both types are cool running. Blowers and special baffles direct cooling air through the DP motor. Types EP and JP are fan-cooled and are built with ribbed frames to increase the cooling surface.

LONGER BEARING LIFE—Original bearing lubrication will last for years in service under normal conditions, but openings are provided in the bearing housing to add fresh grease—remove old grease when required.

Let a Wagner motor application engineer show you how well these motors can fit *your* needs. Call the nearest of our 32 branch offices, or write us. Bulletins MU-202 and MU-203 give complete information on these Wagner Motors. Write for your file copies today.

Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

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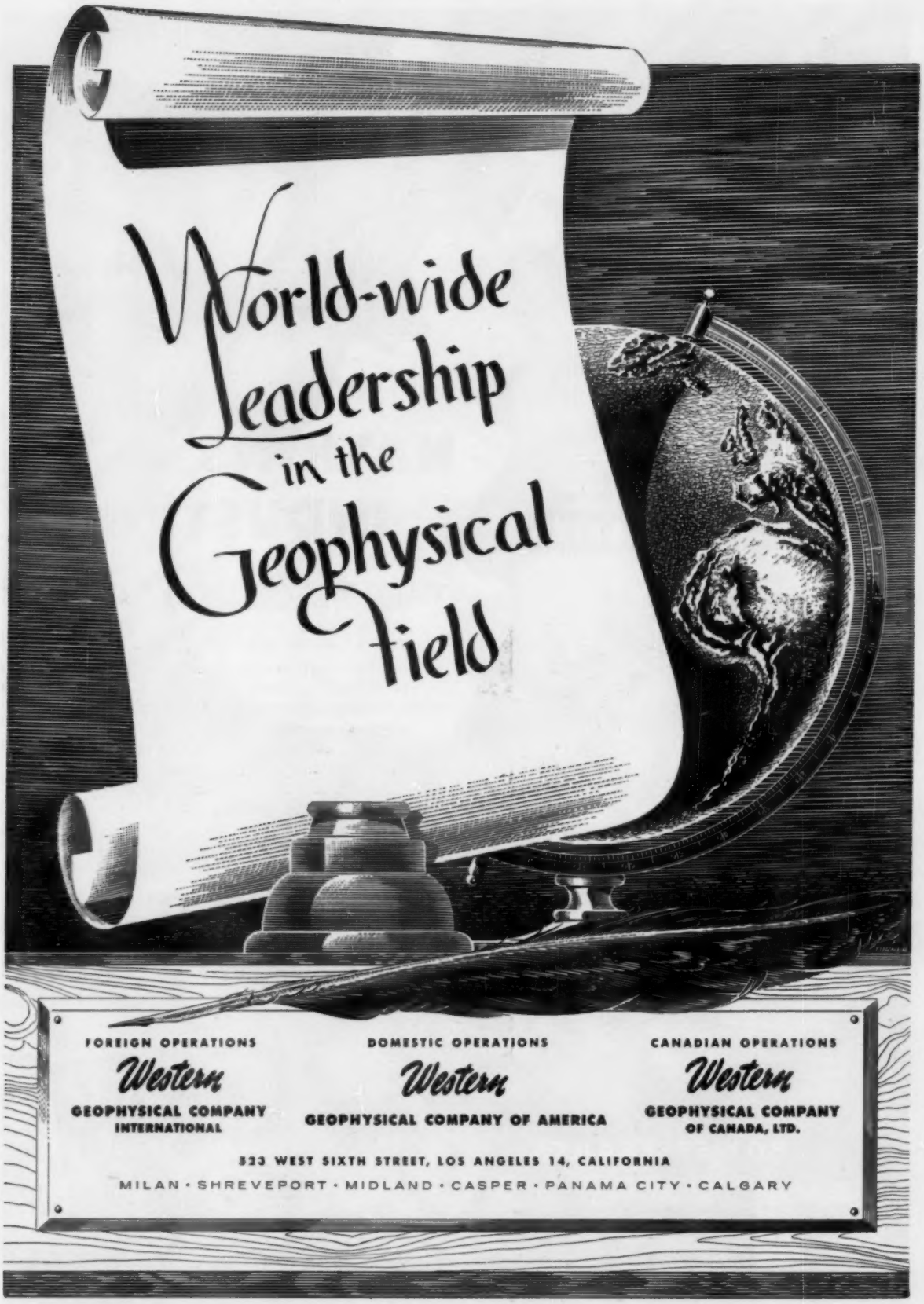
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DROP FORGED STEEL

valves, fittings and flanges by Vogt

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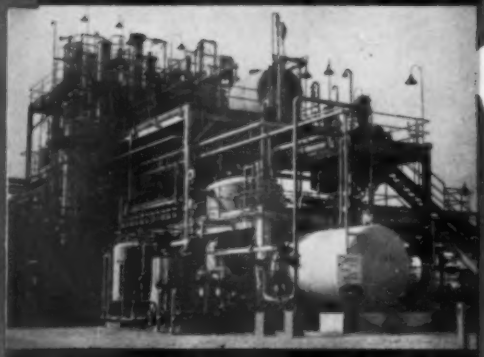
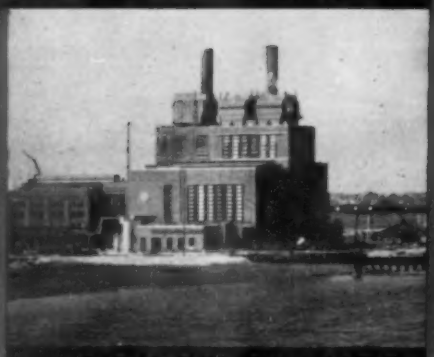


CHEMICAL PLANTS



POWER PLANTS

USED and TRUSTED by the NATIONS KEY INDUSTRIES

There are good reasons behind the trust which America's key industries have placed in Vogt valves, fittings, and flanges for half a century. They know that *drop forged materials* are uniform in structure, fine grained, and free from porosity. They know, too, and appreciate the meticulous care given these products through every stage of forging and machining in Vogt's modern shops, and about the many rigid tests and inspections. And that is why these products enjoy such an impressive record of performance in withstanding the shocks and stresses imposed by high or low pressures and temperatures and in resistance to erosive and corrosive conditions.

Service is another important factor in this confidence because Vogt maintains the world's largest and most complete stock of drop forged steel valves, fittings, and flanges always ready for immediate shipment.

Write for Catalog F-9. Consult its 400 pages for the complete Vogt line of drop forged steel valves, fittings, and flanges for oil, steam, water, air, gas, and refrigeration services.

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SALES OFFICES: New York, Philadelphia, Chicago, Cleveland, Cincinnati, St. Louis, Dallas, Charleston, W. V.

There is a difference in sucker rods

For over 65 years, the S. M. Jones Company has applied **advanced** *field research, engineering, and metallurgy to the manufacture of sucker rods.*

RESULTS: **Jones Sucker Rods** that are the standard of comparison because of their *proved* longer life.

"The S. M. Jones Company modern manufacturing plant, Toledo, Ohio"

THE S. M. JONES COMPANY

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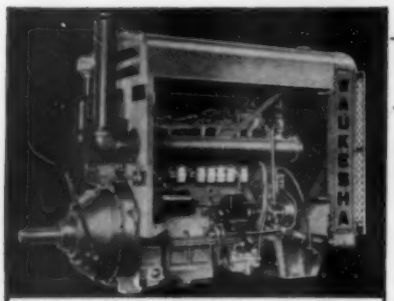
'round and 'round the clock

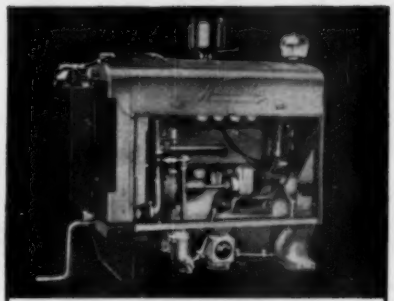
WAUKESHA

LONG LIFE OIL FIELD POWER UNITS

Features and accessories built into these special gas units enable them to operate without maintenance except at greatly extended intervals. Make big savings in pumping; compressor service; and feeder operations.



WAKU Special Long Life Unit—six cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in., 125 continuous (65%) hp at 1200 rpm.

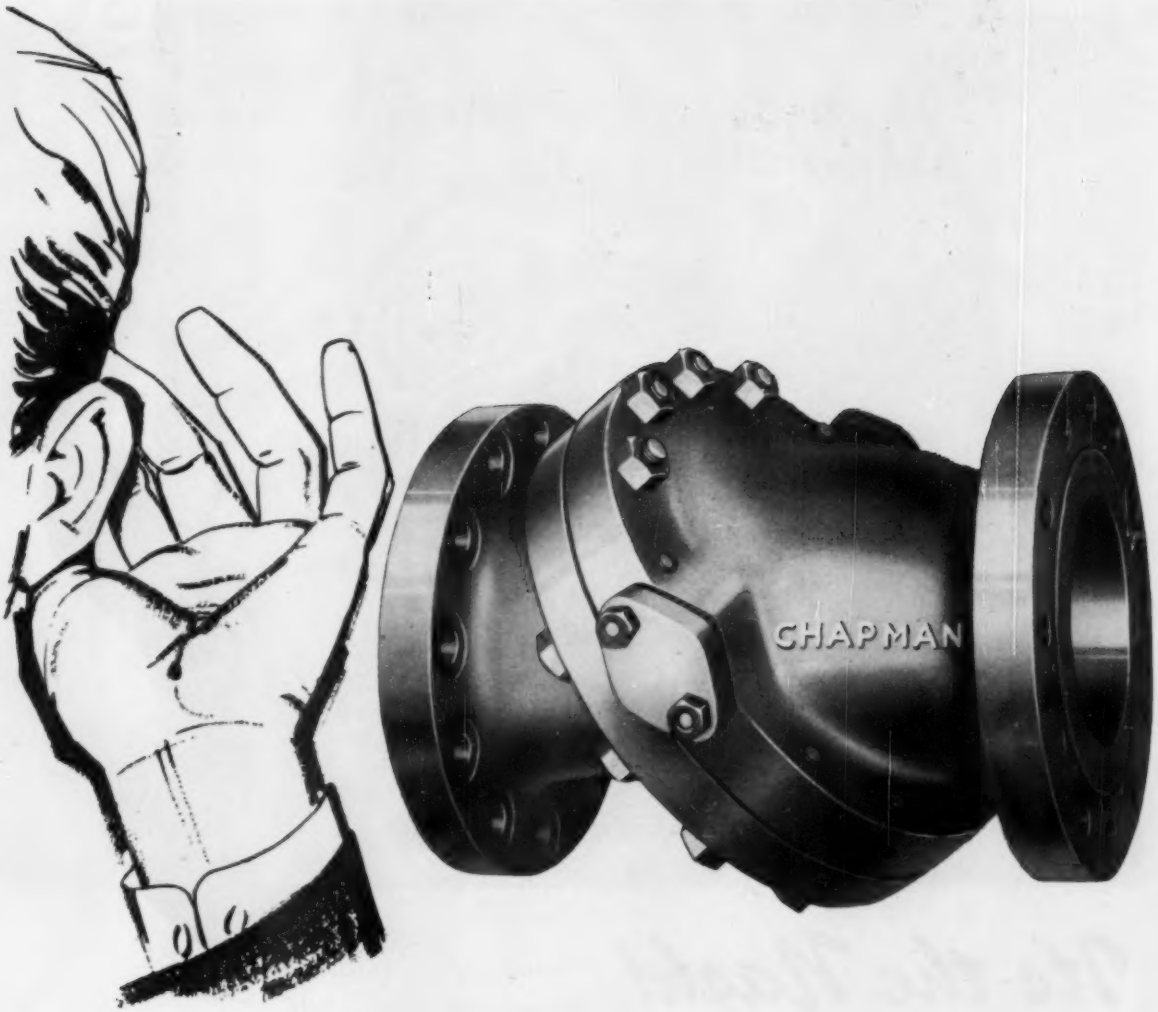


XAHU Utility Long Life Unit—four cyl., 3⅝-in. bore x 4½-in. stroke, 186 cu. in., 21 continuous (65%) hp at 1500 rpm.

365

Sizes range from 133 to 1197 cu. in.—14 hp at 1500 to 124 hp at 1200 rpm continuous duty ratings (65 of max. hp). For details get Bulletin 1702.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN • New York • Tulsa • Los Angeles



With Valves . . . there's nothing like the silent treatment!

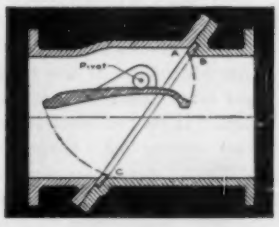
CHAPMAN Tilting Disc Check Valves

Add it all up. With Chapman Tilting Disc Check Valves you get no flutter, no vibration, no slamming or jarring or scraping of disc and seat. You get fast, sure and *quiet* operation at all times.

This is the silent treatment for valves and what it means to you is a matter of dollars and cents. You have less headaches, less trouble, less maintenance for valves and system even under severe operating conditions.

This silent treatment is an exclusive with Chapman Tilting Disc Check Valves in iron and steel . . . has been for years. These quick and quiet valves handle fluids or gases under a wide range of pressures.

You can order them for replacement or new systems. Why not, right now, check our Catalog 30-A? If you don't have a copy readily on hand, write for it today.



Here's the Inside Story

When the flow is on, "airfoil disc," supported on pivot, floats on whatever flow there is. When the flow stops, disc drops quickly, quietly and firmly on special bevel seat. You'll note that there is sufficient space around disc to cut down flow resistance.

THE CHAPMAN VALVE MANUFACTURING CO.

INDIAN ORCHARD, MASSACHUSETTS

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

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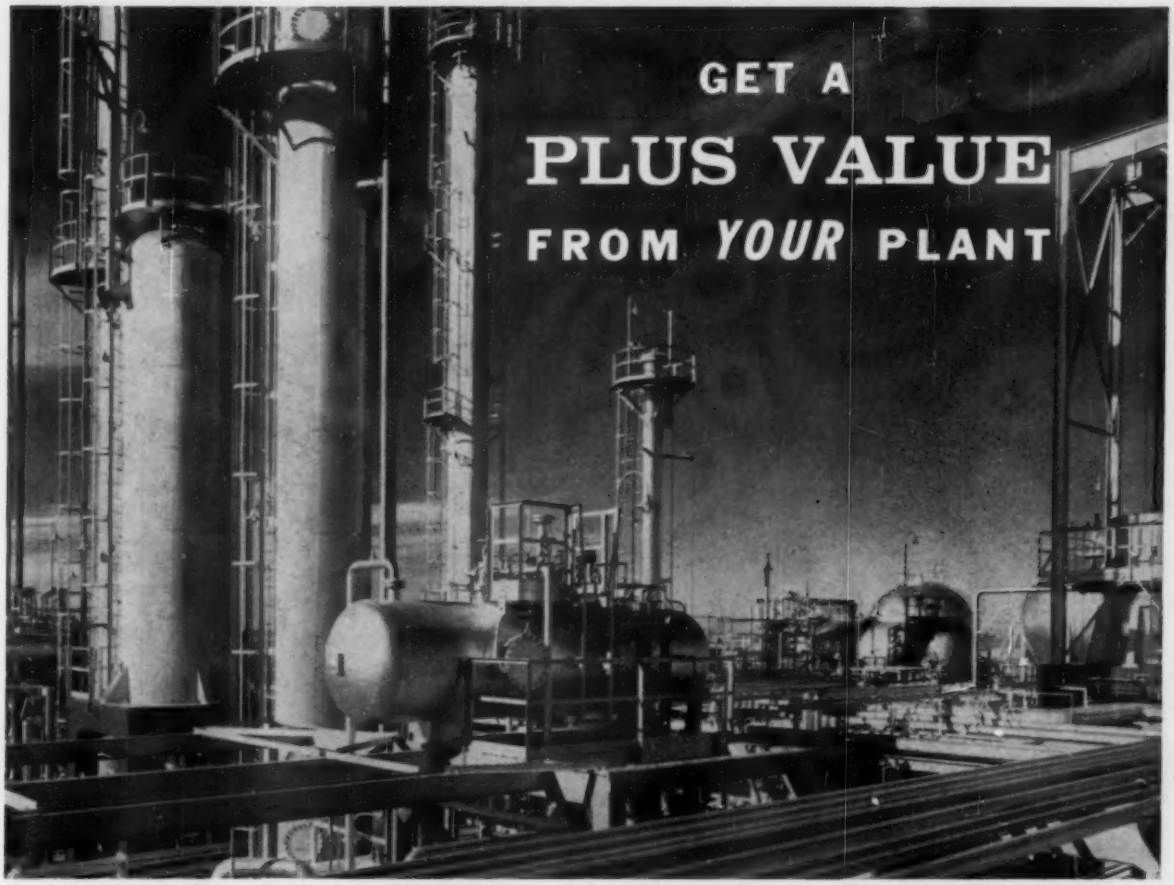

You always get a *plus value* in engineering ability and construction skill when your plant is planned and built by The REFINERY ENGINEERING Company. TRECO has never been guided by *minimum* requirements on any job, large or small.

Remember the *plus value* TRECO offers when you plan your next plant.

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A brochure showing work done by TRECO is available. A copy will be mailed you promptly upon request on your company's letterhead.

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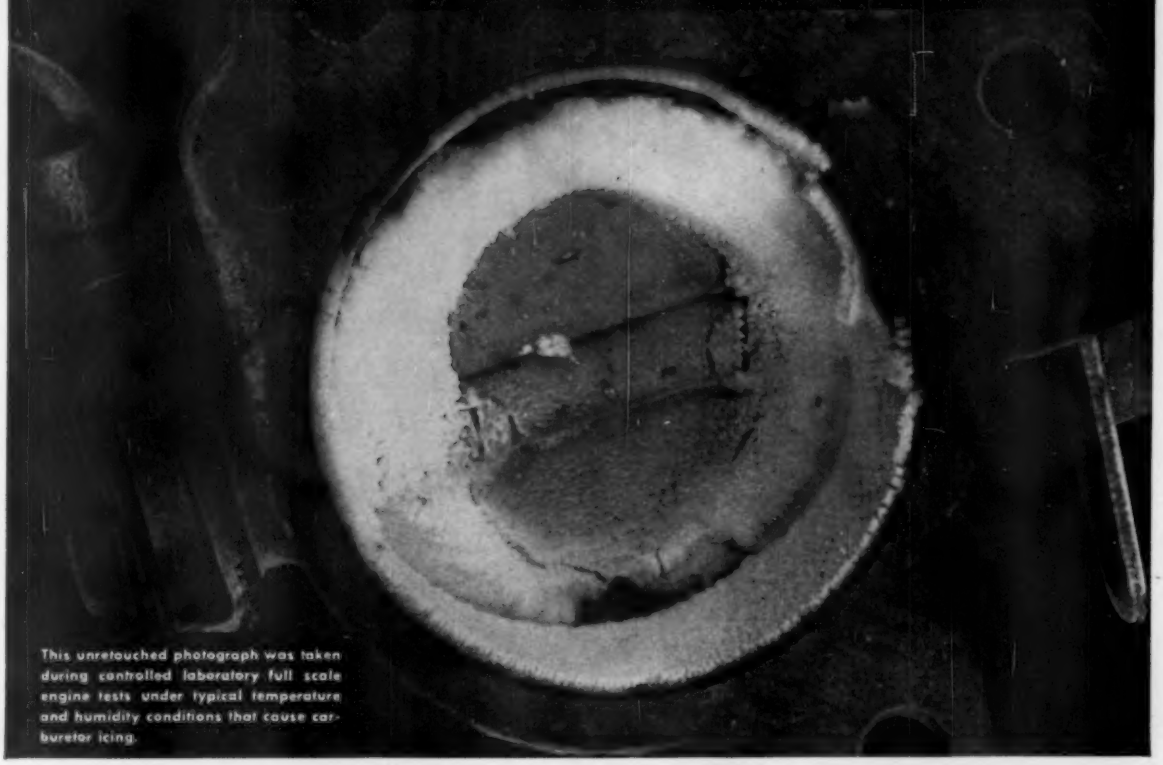
If this happens will your gasoline take the blame?



This unretouched photograph was taken during controlled laboratory full scale engine tests under typical temperature and humidity conditions that cause carburetor icing.

Save That Customer! UNICOR®-LHS PREVENTS CARBURETOR ICING

If carburetor icing happens to stall the car of one of your customers this winter he'll probably cuss out your gasoline, rather than the temperature and humidity conditions that are the real culprits. Keep him happy, and his car rolling, by treating your product with UOP's anti-icing compound, Unicor-LHS. This is a completely new compound, the most effective anti-icing agent yet developed. It is easy to apply and economical to use. Here are its advantages:

Most potent anti-icing agent: Unicor-LHS is an anti-icing agent, not just a de-icer. It prevents ice formation and is about 40 times as effective under severe carburetor icing conditions as the widely-used alcohol type.

No gasoline dilution: Because it is used in very low concentration Unicor-LHS causes no significant loss in BTU value of gasolines, a primary disadvantage of ordinary de-icing compounds.

Convenient and economical: Only small amounts of Unicor-LHS are required . . . less than half the cost of alcohol. No large scale storage or blending facilities needed. It can be applied anywhere from refinery to jobber or filling station.

Not water soluble: Not soluble in water, Unicor-LHS (light hydrocarbon soluble) is completely and instantly miscible in even the lightest components of high vapor pressure winter-grade gasolines.

Available right now: Write our Products Department for samples or for commercial quantities. We'll be glad to advise you on the most economical way to use Unicor-LHS.

Unicor-LHS is also an effective rust and corrosion preventative. Protects refinery processing equipment, distribution and storage facilities all along the line from the refinery to the final distribution point.

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD, DES PLAINES, ILLINOIS, U.S.A.

More Than Forty Years Of Leadership In Petroleum Refining Technology

Helping you handle chemicals with greater safety

The great safety record of the Chemical Industry is inspiring proof that chemical users, as well, can institute and carry out effective safety programs.

As a helpful contribution to this effort, Olin Mathieson has prepared a series of safety wall charts on . . .

CHLORINE • LIQUID CAUSTIC • SULFURIC ACID
ANHYDROUS AMMONIA • NITRIC ACID

These wall charts will keep your employees constantly posted on correct handling procedures, on basic precautions to be observed, and on first aid methods when emergencies *do* occur.

We will gladly send you the safety charts you need without obligation.

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DEPENDABILITY IS A TRUE STORY WITH PARKERSBURG PUMPING UNITS

Trouble-free performance for 24 years is the outstanding service record of the Parkersburg chain-driven pumping unit shown above, right. Twenty-four years of operation for a leading major company, first in the wet, humid fields of East Texas then in the sand-pelted, wind-whipped Permian Basin, without maintenance cost other than changing oil and replacing a link in the chain drive.

Producers everywhere know that similar dependable service can be expected of the new Parkersburg gear-driven pumping unit at left, above, that has recently been installed with the older unit to produce two zones in this well. For dependability is a tradition with Parkersburg pumping units. They are dependable because they are designed and manufactured to give trouble-free performance.

Buy dependability! It costs no more when you specify a Parkersburg pumping unit. And Parkersburg has a pumping unit to fit any requirement.

At Parkersburg, Quality and Service Have Gone Hand-in-Hand for 60 Years!

The PARKERSBURG RIG & REEL COMPANY

DIVISION OF PARKERSBURG–ÆTNA CORPORATION

PUMPING UNIT DIVISION OFFICES:
710 Mid-Continent Building — Tulsa, Oklahoma

over 90% of the wells drilled in France used tools by BAASH-ROSS

"UC" CASING SLIPS

by Baash-Ross

have these features...

WRAP AROUND casing and exert uniform pressure at all points.

ALL SEGMENTS set at exactly the same level eliminating concentration of slip pressure and safeguarding the casing against bottle-necking or deformation.

DESIGNED AND MANUFACTURED to accommodate the longest and heaviest casing strings.

MAINTAIN perfect alignment at all times and automatically center the casing in the bushing.

For further information write P.O. Box 1848, Houston 1, Texas or see The Composite Catalog.

Because of the heavy weight of most casing strings and the relatively thin wall of the pipe, it is extremely important that the slips used for supporting casing strings be especially designed to insure a full-circumferential grip on the surface of the pipe. BAASH-ROSS TYPE "UC" CASING SLIPS eliminate the problems encountered when using other type casing slips. Buy through your supply store.

BAASH ✳ ROSS
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FROM OIL: curb-to-curb carpet for America's roads. Gleaming black asphalt ribbons our highways from coast to coast. Its low first cost, economical maintenance, velvety smooth surface, and long life are the main reasons that 75% of today's asphalt production goes to make better roads. Why should *you* be interested? First, because asphalt is an important petroleum product, and second, because as a taxpayer you get more miles per taxpayer dollar—an extra mile in every ten! So every chance you get, speak up for asphalt—and better roads at lower cost. **SHELL OIL COMPANY**

PROTECTION

INDICATORS

Cameron

WEIGHT INDICATORS

The Cameron Weight Indicator is so accurate in its readings that the operator can maintain any desired weight on the bit within a very slight tolerance, thus assuring peak drilling efficiency. This accuracy is essential for cutting and fishing operations, packer fittings, or any bottom hole operation requiring precise control of weight. It serves, too, as a protection for your derrick and drilling facilities.

Cameron

SHEAR RELIEF VALVES

Cameron Shear Relief Valves are designed to protect pumps, manifolds, mud lines and other expensive components against excessive pressure. These remarkable relief valves shear a common nail (US Standard) to relieve destructive pressure overloads. Any worker can choose the right nail with the handy hole chart on each Shear Relief Nameplate. They are a simple, foolproof design, with a protective cap for extra safety.

Cameron

PRESSURE GAUGES

Cameron Pressure Gauges for mud, water, oil, air, gas or any liquid are of extremely rugged construction. Designed for oil field drilling and similar services, they dampen pump pulsations. The face is easily visible. They are unaffected by external vibrations, and line fluids cannot enter the gauge unit. Non-corrosive cases of Bronze are available for offshore operation.

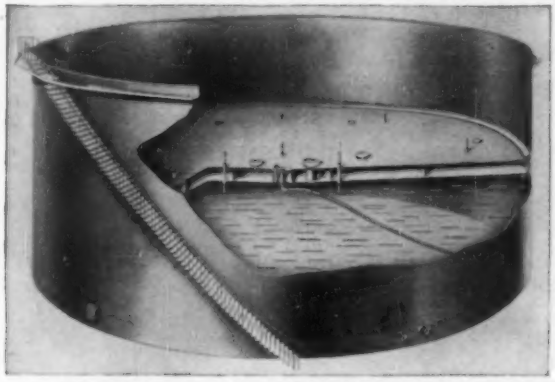
Count on Cameron's protection indicators for the control of pressures and weights.

Cameron

IRON WORKS, Inc.
P. O. Box 1212-Houston, Texas

Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd., Time & Life Bldg., New Bond Street, London W. 1 England

EIGHT NEW GRAVER DOUBLE DECK TANKS INCREASE TERMINAL CAPACITY 415,200 BBLS.



★ Roof always in contact with product.
★ No air space beneath lower deck for vapors to form or corrosion to take place.
★ Air space between the decks insulates against heat transfer.
★ Non-tilting and non-sinking.
★ Simple, effective patented sealing mechanism.

Today the petroleum industry is vitally interested in developing port, terminal and storage facilities. Typical of recent construction is the addition to the Los Angeles Refinery Terminal of the Union Oil Company of California pictured here. These eight Graver Double Deck Floating Roof Tanks, ranging in size from 10,700 bbls. to 131,200 bbls., are ideally suited for storing product. They have doubled the previous storage and handling capacity.

The Graver Double Deck Floating Roof Tank, diagrammed at the left, is a much improved design for the vapor-saving storage of gasoline and the corrosion-resistant storage of crudes. At refineries and terminals the many advantages make this design a far sounder investment than less efficient equipment.

1857-1957 GRAVER Our 100th Year

Building for the Future on a Century of Craftsmanship in Steels and Alloys

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA • NEW YORK • PHILADELPHIA • EDGE MOOR, DELAWARE
PITTSBURGH • DETROIT • CHICAGO • TULSA • SAND SPRINGS, OKLAHOMA
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Perfectly Balanced... Extra Heavy

and always so smooth in action!

Are all traveling blocks alike?

Not by a long shot. What, then, should you look for in buying new blocks for your rigs?

First, stability—balance. (You'll find it in Bethlehem blocks. Weight is distributed perfectly. Sidesway is thereby reduced to an absolute minimum.)

Second, the ability to fall freely. (Bethlehem blocks are all extra heavy. They have the bulk, the "heft," that assures a rapid fall, even without load.)

Third, smoothness in operation. (Here again Bethlehem blocks are outstanding. Smoothness in action is largely a matter of bearing quality and construction. Each sheave in a Bethlehem block is equipped with a durable two-row tapered roller bearing, which is individually lubricated by a centralized pressure-grease system.)

There's a Bethlehem traveling block for every drilling depth. The various sizes range in capacity from 100 to 600 tons. Matching crown blocks are available for the two largest units, known as the B-50 and the B-55.

Full information will be furnished by the nearest Bethlehem sales office or store.

A size for every drilling depth

Model	Rating	Wt. with Bail, lb
B-30-3*	100 tons	3020
B-30-4*	100 "	3520
B-36-4*	200 "	6195
B-42-4*	350 "	10009
B-42-5*	350 "	11300
B-50-5	450 "	12390
B-50-6	450 "	13585
B-55-5	600 "	19850
B-55-6	600 "	22030

* Can be unitized with the commonly used types of hooks.

BETHLEHEM SUPPLY COMPANY
General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.

Canadian Distributor: Bethlehem Supply Company of Canada, Ltd.
Calgary, Alberta, Canada
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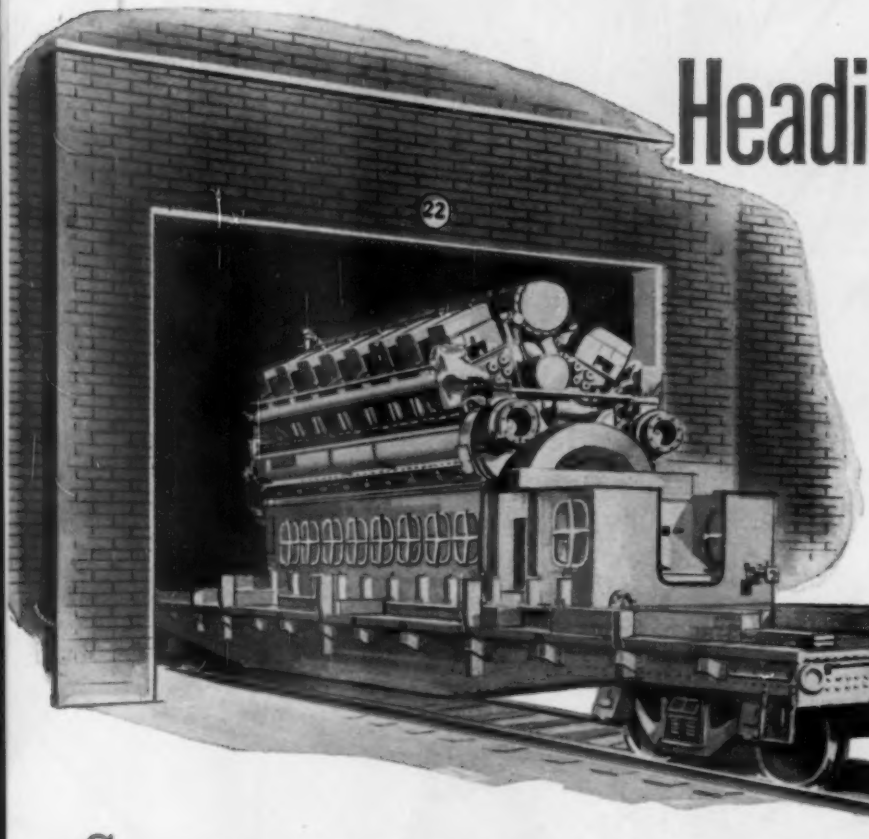
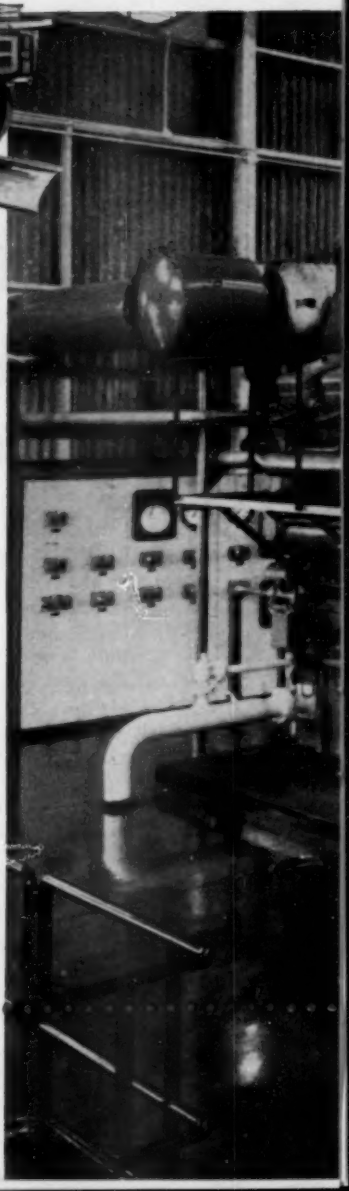
BETHLEHEM STEEL

BETHLEHEM SUPPLY

Heading for low more and Engine





Shipments of Nordberg Supairthermal® Gas Engines with integral gears for compressor service emphasize the increasing application of these highly efficient prime movers by major gas transmission companies.

Advantages of Supairthermal gas engine-gear sets are summarized as follows:

(1) Lower cost per installed horsepower; (2) Lower operating cost; which results in (3) Lower transmission cost.

(4) Ability to handle variations in volume and compression ratios with high efficiency at variable speeds.

(5) Adapability to remote-automatic operation.

Nordberg engines are, by all standards, your best investment in economical, long term pipe line power. Chances are, you too will benefit by using Nordberg engines on your next pipeline expansion program. Write for further information.

NORDBERG

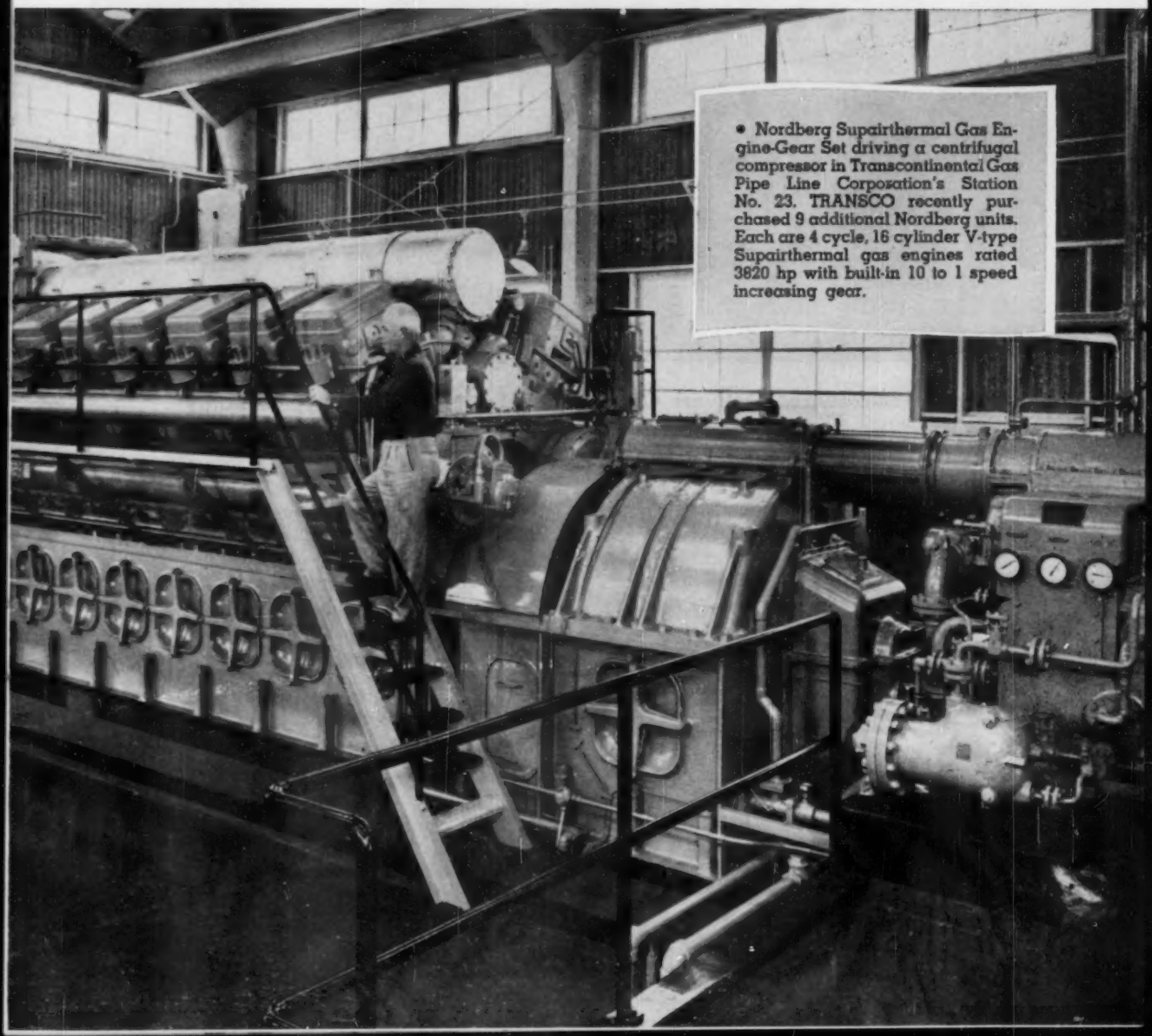
DIESEL • DUAFUEL® AND SPARK-IGNITION GAS ENGINES

0457

© 1957, N. M. Co.

NORDBERG MFG. CO., Milwaukee, Wisconsin

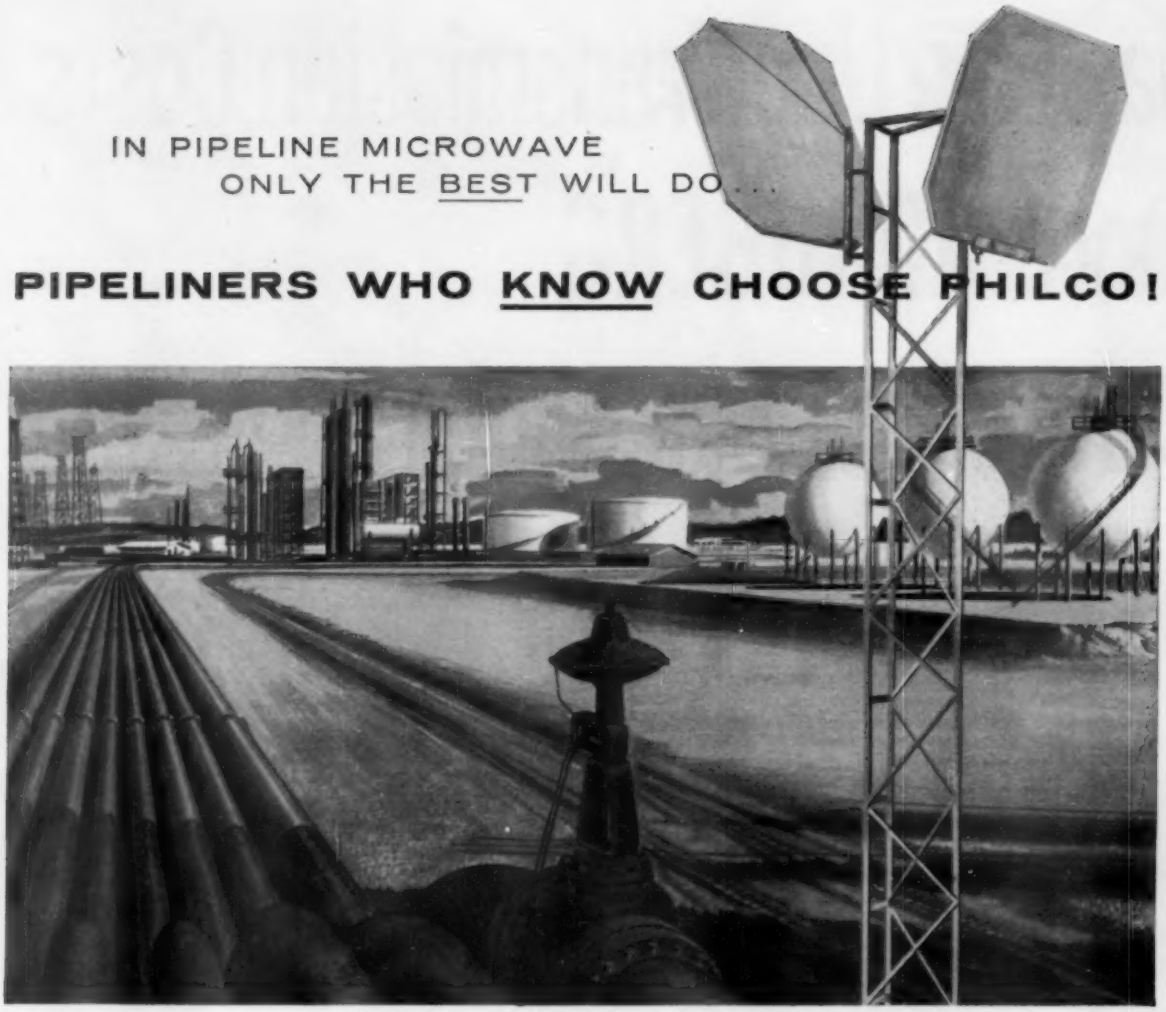
Gas Pipe Line Transmission Costs... more NORDBERG Centrifugal Gas Compressor Sets



• Nordberg Supairthermal Gas Engine-Gear Set driving a centrifugal compressor in Transcontinental Gas Pipe Line Corporation's Station No. 23. TRANSCO recently purchased 9 additional Nordberg units. Each are 4 cycle, 16 cylinder V-type Supairthermal gas engines rated 3820 hp with built-in 10 to 1 speed increasing gear.

IN PIPELINE MICROWAVE
ONLY THE BEST WILL DO . . .

PIPELINERS WHO KNOW CHOOSE PHILCO!



Philco Microwave Delivers Outstanding System Reliability, Economy of Installation and Operation, Simplified Equipment Maintenance!

Philco microwave is proving itself in a growing number of pipeline applications. With 240 channel baseband capacity for telephone, telemetering and remote control—including reserve capacity for high-speed computer data transmission—Philco microwave fills both immediate and long-range requirements of modern pipeliners.

Semiconductor rectifiers replace conventional tubes in the new Philco heavy duty tubeless power supplies, assuring minimum maintenance and significant reductions in operating costs. Printed wiring panels increase circuit stability, simplify field maintenance. Klystrons are cooled by convection—compact heat sinks eliminate the need for bulky blowers.

Here is reliability of performance unaffected by severe weather, free from the many limitations of wire and pole line construction, unhampered by problems of difficult terrain, over-water transmission or expensive rights-of-way.

Philco engineers will be happy to help with your special microwave requirements. Please contact us for further information. Look ahead . . . and you'll choose PHILCO.

PHILCO®

Government & Industrial Division
Philadelphia 44, Pennsylvania
In Canada: Philco Corporation of Canada Limited, Don Mills, Ontario

DOW CORNING CORPORATION

Silicone News

FOR PETROLEUM MEN — No. 3

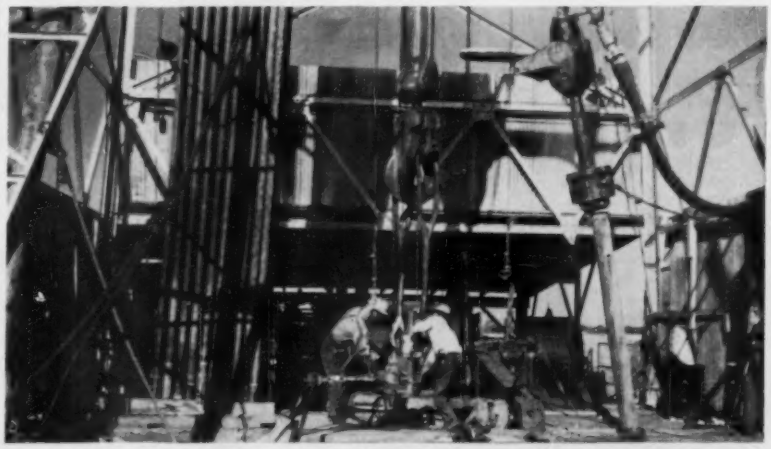
How to End Wire Burn-outs

Do you have electric wire or cable that's exposed to high ambient temperatures? If so, here's a way to avoid burn-outs and save real maintenance money.

A Gulf coast refinery was plagued with frequent failures of wiring on a hydroformer. Temperatures ranging up to 250 F caused conventional wire insulation to

burn out in as little as three months. Refinery engineers then replaced some five miles of the old wire with silicone rubber covered wire. Result: excellent service. Wire covered with Silastic®, the Dow Corning silicone rubber, has eliminated so much downtime and saved so many man-hours in this refinery that it is now specified for all new and replacement wiring in areas where it will be subjected to over 140 F. Ask your own supplier about heat and moisture resistant wire and cable insulated with Silastic. *No. 9*

®T. M. REG. U. S. PAT. OFF.



SAVE WITH SILICONE INSULATION

Silicone insulation improves operation of drilling rig brakes and couplings — minimizes failures.

The Baylor Company of Houston, manufacturer of drilling auxiliaries, has now switched to silicone insulation on all its Elmagco magnetic brakes and couplings. Savings are reported to be substantial.

Elmagco brakes are designed to dissipate energy at rates up to 5000 hp in lowering drill strings. In operation, however, unforeseen circumstances can cause higher demands. For example, in one case the supply of cooling water failed while a 12,600 foot string was being lowered. Total energy developed while lowering the string the rest of the way to the bottom was estimated at a billion and a half foot-pounds. The brake got so hot it glowed. The motor rotor warped and was ruined. Yet afterward, the silicone insulated coils in the stator tested out as good as new!

Baylor guarantees its brakes and couplings for one year — has been able to provide a more dependable unit and yet hold the price line through savings such as cutting first-year replacements of coils from 30 percent of total production down to 0.55 percent.

In pump motors, transformers and other electrical equipment, the story is the same: heat resistant silicone insulation gives more muscles for the money. *No. 7*

Silicone Defoamer Steps Up Refinery Production

Wherever smooth, efficient production is hampered by a foaming problem, one of Dow Corning's versatile silicone defoamers will usually provide an effective and economical solution.

A Texas refinery is successfully using Dow Corning Antifoam A to curb foaming in a 15% solution of diethanolamine (DEA). The DEA removes hydrogen sulfide and carbon dioxide gases from a propane-propylene gas stream. Formerly, it foamed severely.

The DEA solution is introduced into the gas stream where it absorbs the acid gases; the acid is then driven off with heat and the DEA is used over again. Antifoam A is added to the lean DEA solution whenever foaming develops. Approximately 1 quart of Antifoam A injected every 3 weeks into 200 barrels of the circulating DEA solution assures an uninterrupted flow for more efficient production. *No. 8*

Send Coupon Today

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Midland, Michigan
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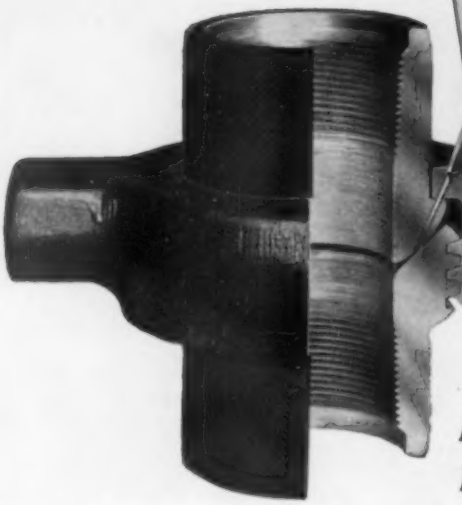
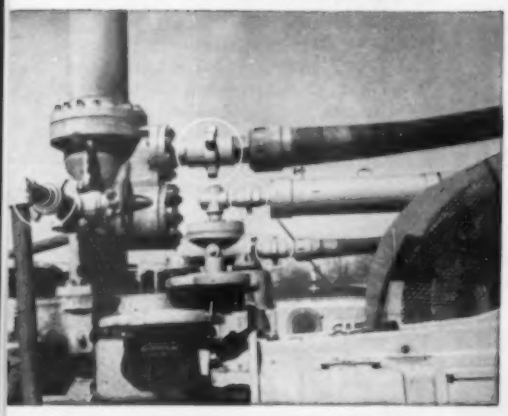
Canada: Dow Corning Silicones Ltd., Toronto; **Great Britain:** Midland Silicones Ltd., London; **France:** St. Gobain, Paris

Perfect sealing is a matter of engineering principle with WECO unions





Ball and Cone Seat Design Provides Positive Leakproof Seal for High or Low Pressures.

For 23 years, WECO Unions have set the standard for the industry; have stayed out in front because of a fundamentally correct engineering principle—the ball and cone design that prevents leaks under high pressures, shock, surge or vibration.

With the spherical male part seated in a concentric circle in a mirror-finished conical female part, unequaled metal-to-metal sealing is obtained time after time, every time.

In addition, WECO Unions have stronger subs and wing nuts, heavier wall construction and sturdy Acme threads. Thus, they stand up on the toughest jobs, continue to operate with easy efficiency under extremes of pressures, volumes and abrasions.

There's a WECO Union for every oil industry service—from the world's most complete line. Available at supply stores everywhere, in sizes from 1" through 12", pressures from 1,000 through 15,000 psi.

U-2-57

WECO®

WELL EQUIPMENT MFG. CORP.

HOUSTON, TEXAS

Division of CHIKSAN COMPANY, *a subsidiary of* FOOD MACHINERY AND CHEMICAL CORPORATION

fmc

One in a series.

How to Select a Steam Trap Big Enough for the Job

Adequate capacity safety factors are essential to operating efficiency

As promised to you in a previous Armstrong trap advertisement in this publication, here is some helpful information on steam trap safety factors.

First, the definition. A trap safety factor is simply the ratio between actual continuous discharge capacity of the trap and normal condensate load. If the load is 500 lb/hr and the trap actually will discharge at the rate of 1000 lb/hr, the safety factor is said to be 2 to 1, and so on.

Why a Safety Factor?

You are not going to get maximum heat transfer efficiency from any steam heated unit unless your traps are sized with a generous excess of capacity over the normal condensate load.

Remember that trap capacity is given in terms of *continuous* discharge of condensate at a given pressure differential. If you don't employ an adequate safety factor, you make no provision for these requirements or conditions:

1. ***Venting of gas,*** O_2 and CO_2, would be impossible if a trap should discharge a full stream of water continuously.

2. ***Peak loads*** would back up condensate in the line or unit if the trap were sized for average load.

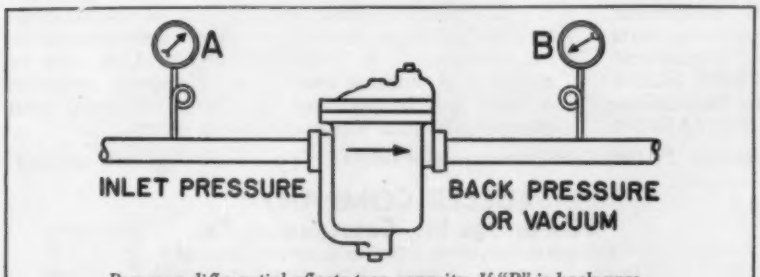
3. ***Reduction in pressure differential*** across the trap orifice would reduce capacity below requirements. If steam pressure drops below normal, trap capacity is lowered more than condensing rate. An increase in back pressure for any reason cuts trap capacity. And, pressure differentials often drop substantially during warming-up periods.

4. ***"Group" trapping.*** Very occasionally it is impractical to use an individual trap on each coil or condensing unit. Here, a generously oversized trap helps prevent backup of condensate or air from one unit to another. The frequent opening of a big trap valve "pumps" non-condensibles and condensate to the drain header.

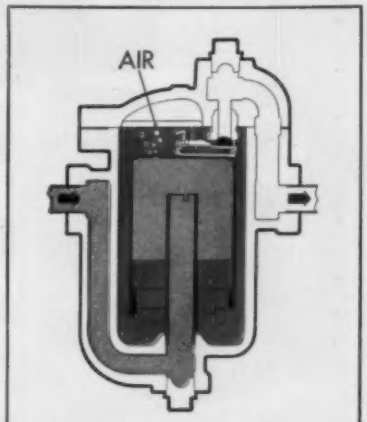
What Safety Factor?

Fortunately, it isn't necessary to calculate safety factors. Experience is the best guide and the benefit of experience with tens of thousands of successful installations is available to you. The following table is taken from the Armstrong Steam Trap Book.

Page	Equipment Drained	Safety Factors
24	Purifiers and Separators	2 or 3 to 1
25	Steam Mains or Headers	2 or 3 to 1
26	Steam Heating Pipes...	2 to 1 up to 6 to 1
29	Unit Heaters.....	3 to 1
30	Submerged Coils.....2,	3 or 4 to 1
32	Cylinder Dryers.....	4 to 1 up to 10 to 1



Pressure differential affects trap capacity. If "B" is back pressure, subtract from "A"; if "B" is vacuum, add to "A". Safety factors compensate for drops in pressure differential.



Traps vent air. This requires a trap capacity safety factor.

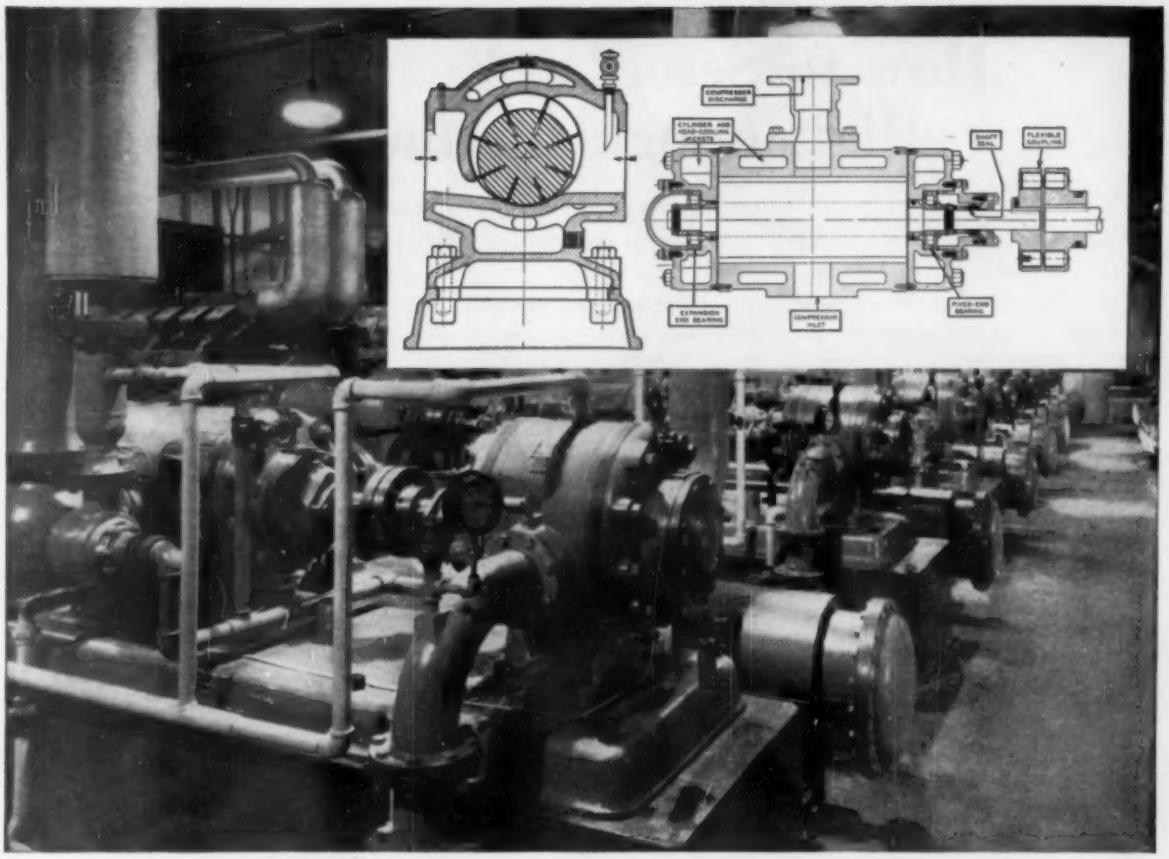
The page numbers listed contain completely reliable data for any trapping job.

CAUTION. The safety factors recommended in The Armstrong Steam Trap Book will have to be increased by an unknown factor for trap capacity ratings based on cold water tests, orifice tests or slide rule calculations. Armstrong trap steam temperature condensate capacity ratings are based on actual operating conditions which take into account such capacity-reducing factors as pipe friction and the choking effect of flash steam.

If you'd like to have a copy of the 44-page Steam Trap Book, just call your local Armstrong Representative, or write the factory. There is no obligation.

Armstrong Machine Works
8682 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS



HERE ARE 7 FULLER ROTARY COMPRESSORS

. . . in *any* quantity they are an investment in dependability

The wide and continuing acceptance of the Fuller Rotary Compressor in the petroleum industry is based on a number of unique design features, eminently suited for gas gathering and boosting in any rugged situation. Indoors or out, its trouble-free operation makes for minimum maintenance and operating costs.

There are 8 good reasons why the Fuller Rotary Compressor enjoys such widespread use—they may easily serve as reasons why your next compressors should be Fuller Rotaries.

1. SIMPLICITY—Elimination of compressor valves, crankshafts, pistons and other moving parts greatly reduces the need for attention, adjustment and replacement. 2. PULSATION-FREE FLOW—Rotary compression eliminates pressure fluctuations and simplifies metering problems. 3. SUSTAINED PERFORMANCE—Blades are held out by centrifugal force, automatically compensating for wear, thus maintaining new-machine efficiency and capacity. 4. NON-VIBRATING—Rotary principle permits a design completely free of reciprocating parts, avoiding basic cause of vibration.

5. COMPACTNESS—Large capacity in relation to size results in lighter weight, compact, transportable units. 6. EASE OF INSTALLATION—In smaller sizes, no foundation is needed. Larger units need only concrete slab for foundation. Automatic safety controls are incorporated in package. 7. ECONOMY—Few moving parts of the compressor, and their accessibility, reduce maintenance to the minimum. 8. VERSATILITY—Unit can be operated at various conditions. Capacity variation of 50% can be obtained by change of speed with engine, turbine, or two-speed motor drives.

We'd like to send you fully-descriptive Fuller Compressor literature. It's yours for the asking.

FULLER COMPANY
132 Bridge St., Catasauqua, Pa.
A SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORP.
Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

C-287
2024

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

men with Oil in their blood

Seldom do Legrand users have a change of heart, they know the importance of rugged, dependable pumping equipment. Available to meet all oilfield pumping demands are units from 3,000 lbs. to 33,000 lbs. polished rod load and 24" to 132" stroke. All units are floor clearing with rack-and-pinion balance weight adjustment, API Standard gear reducers, LEGRAND patented double-taper wristpins, self-aligning equalizer and wristpin bearings, lateral and fore-and-aft beam adjustment, swing back mulehead, LEGRAND patented carrier bar, ground level lubrication, all bolting in "Unified" series. Incorporating the most up-to-date design features LEGRAND Pumping Units are the result of long practical experience in the Oil Fields of the world.

LEGRAND

also Manufacturers of LEGRAND-O.C.T. Well-head Equipment: LEGRAND-HOWCO Floating Equipment: LEGRAND-S.C. CARTER Long-stroke Hydraulic Pumping Units.

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Apartado 304,
Maracaibo, W. Venezuela.

How neoprene tanks slash costs for Dowell customers

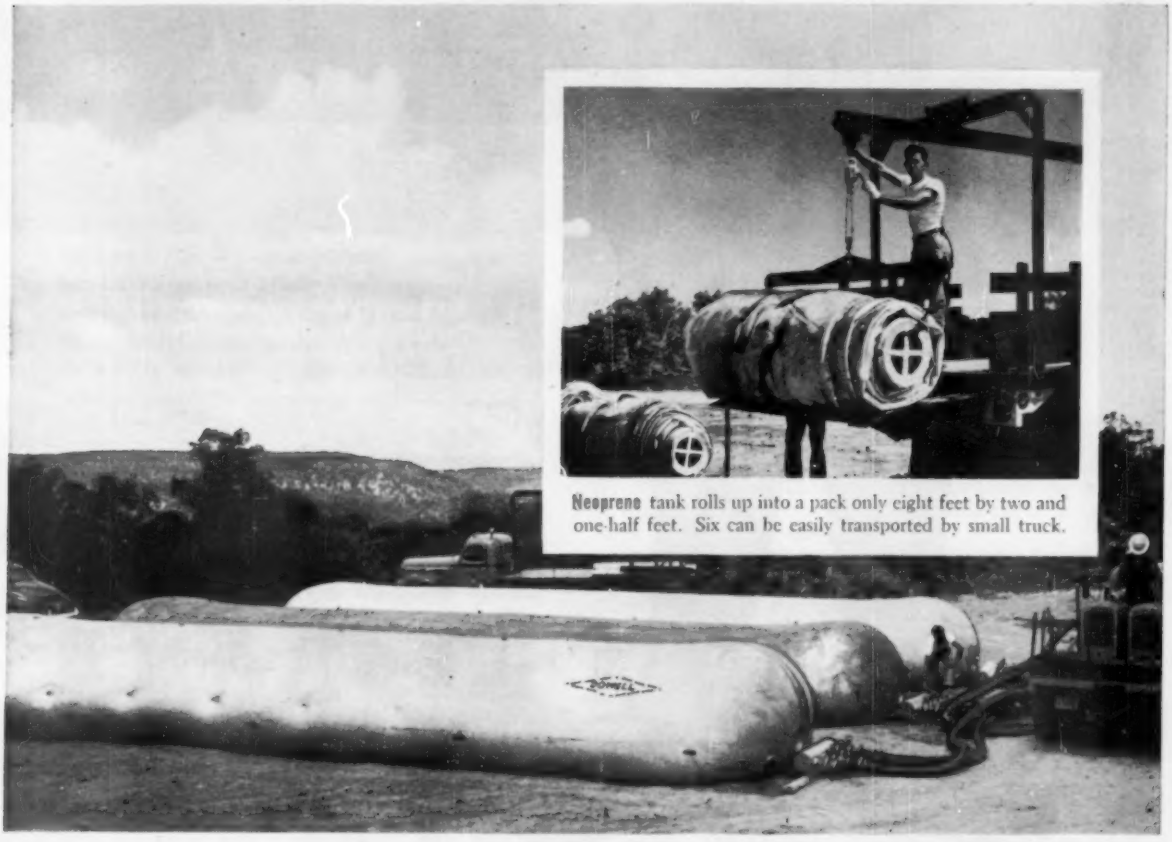
In the rugged San Juan Basin, Dowell, Incorporated, offers its customers collapsible storage tanks* made of nylon fabric, coated inside and out with Du Pont neoprene. By using these synthetic rubber tanks instead of steel tanks on well stimulation treatments, Dowell's customers are cutting transportation, handling and maintenance costs and saving vital time.

Each 15,000-gallon tank rolls up like a sleeping bag. Six can be carried on a small truck, for they weigh only 1350 pounds including fittings. When filled with water, crude or refined oils, they are 47 feet long, 10 feet 8 inches wide and 5 feet 3 inches high. The use of neoprene in these tanks is highly desirable because the rubber lining must resist oil and the cover must resist deterioration by sunlight, abrasion and rough handling.

Oil men around the world have found hundreds of uses for neoprene because of its unique combination of properties. It resists deterioration under the most adverse conditions because it withstands oil and corrosive chemicals, sunlight, heat, cold and aging.

Why not let neoprene save money for you? Next time you're buying piston rubbers, pipe wipers, rotary drilling hose or gaskets, specify NEOPRENE.

*PATENT PENDING



Neoprene tank rolls up into a pack only eight feet by two and one-half feet. Six can be easily transported by small truck.

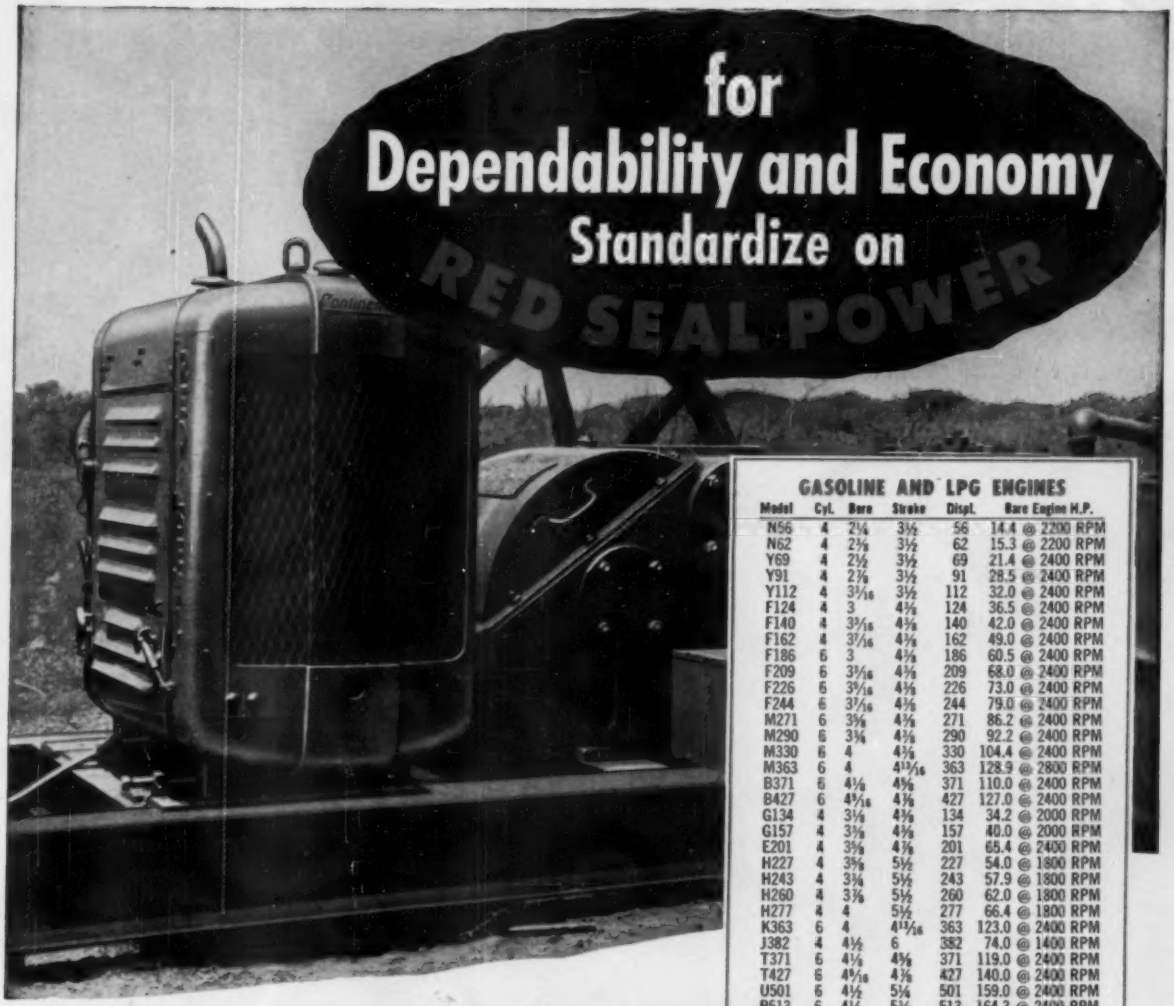
NEOPRENE

MADE BY DU PONT FOR 25 YEARS

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . through chemistry



A product of more than 55 years' specialized experience, Continental Red Seal oil field power embodies an array of quality features—many of them exclusive—that make for dependability, economy and long trouble-free life. The Red Seal Model F-162 shown above, operating in Stonewall County, Texas, replaced another Red Seal which had been in pumping service continuously for eight years. . . . Red Seals are engineered for every oil field application. They are available at closely-spaced power levels, for use on all standard fuels. Ask your oil field supply store or get in touch with your nearest Continental office.

• • •

SERVICE FACILITIES AND GENUINE RED SEAL PARTS AVAILABLE EVERYWHERE

GASOLINE AND LPG ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
N56	4	2¼	3½	56	14.4 @ 2200 RPM
N62	4	2⅜	3½	62	15.3 @ 2200 RPM
Y69	4	2½	3½	69	21.4 @ 2400 RPM
Y91	4	2⅞	3½	91	28.5 @ 2400 RPM
Y112	4	3 1/16	3½	112	32.0 @ 2400 RPM
F124	4	3	4½	124	36.5 @ 2400 RPM
F140	4	3 1/16	4½	140	42.0 @ 2400 RPM
F162	4	3 7/16	4½	162	49.0 @ 2400 RPM
F186	6	3	4½	186	60.5 @ 2400 RPM
F209	6	3 1/16	4½	209	68.0 @ 2400 RPM
F226	6	3 3/16	4½	226	73.0 @ 2400 RPM
F244	6	3 7/16	4½	244	79.0 @ 2400 RPM
M271	6	3⅝	4½	271	86.2 @ 2400 RPM
M290	6	3¾	4½	290	92.2 @ 2400 RPM
M330	6	4	4½	330	104.4 @ 2400 RPM
M363	6	4	4 13/16	363	128.9 @ 2800 RPM
B371	6	4⅛	4⅝	371	110.0 @ 2400 RPM
B427	6	4 5/16	4⅝	427	127.0 @ 2400 RPM
G134	4	3½	4⅝	134	34.2 @ 2000 RPM
G157	4	3⅝	4⅝	157	40.0 @ 2000 RPM
E201	4	3⅝	4⅞	201	65.4 @ 2400 RPM
H227	4	3⅝	5½	227	54.0 @ 1800 RPM
H243	4	3¾	5½	243	57.9 @ 1800 RPM
H260	4	3⅞	5½	260	62.0 @ 1800 RPM
H277	4	4	5½	277	66.4 @ 1800 RPM
K363	6	4	4 13/16	363	123.0 @ 2400 RPM
J382	4	4½	6	382	74.0 @ 1400 RPM
T371	6	4⅛	4⅝	371	119.0 @ 2400 RPM
T427	6	4 5/16	4⅝	427	140.0 @ 2400 RPM
U501	6	4½	5¼	501	159.0 @ 2400 RPM
R513	6	4½	5⅓	513	164.3 @ 2400 RPM
R572	6	4¾	5⅓	572	182.4 @ 2400 RPM
R602	6	4⅞	5⅓	602	191.7 @ 2400 RPM
V603	8	4⅜	4¼	603	220.0 @ 2800 RPM
S749	6	5⅛	5½	749	217.0 @ 2200 RPM
S820	6	5⅜	5½	820	237.0 @ 2200 RPM

CUSHIONED POWER DIESEL ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
ZD129	4	3¼	3⅜	129	34.0 @ 2000 RPM
GD157	4	3½	4⅛	157	39.0 @ 2000 RPM
*ED201	4	3⅝	4⅞	201	45.8 @ 2000 RPM
HD243	4	3¾	5½	243	55.0 @ 2000 RPM
*HD260	4	3⅞	5½	260	59.0 @ 2000 RPM
*HD277	4	4	5½	277	63.2 @ 2200 RPM
*JD382	4	4½	6	382	72.5 @ 1600 RPM
TD427	6	4 5/16	4⅞	427	106.0 @ 2000 RPM
RD572	6	4¾	5⅓	572	154.0 @ 2000 RPM
VD603	8	4½	4¼	603	175.0 @ 2600 RPM
SD802	6	5 5/16	5½	802	202.0 @ 1800 RPM

*Available for industrial applications only.

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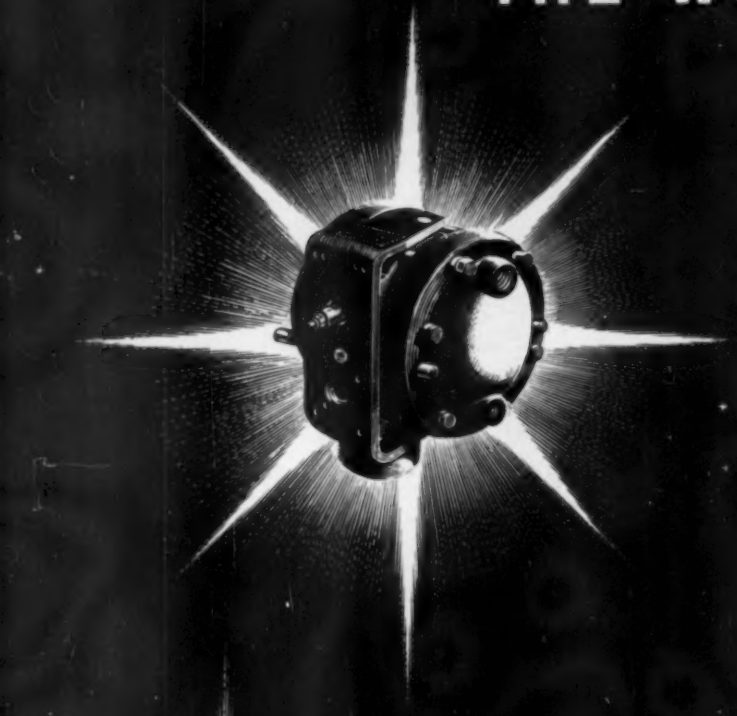

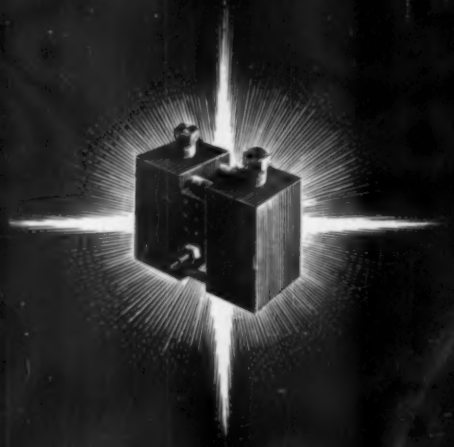

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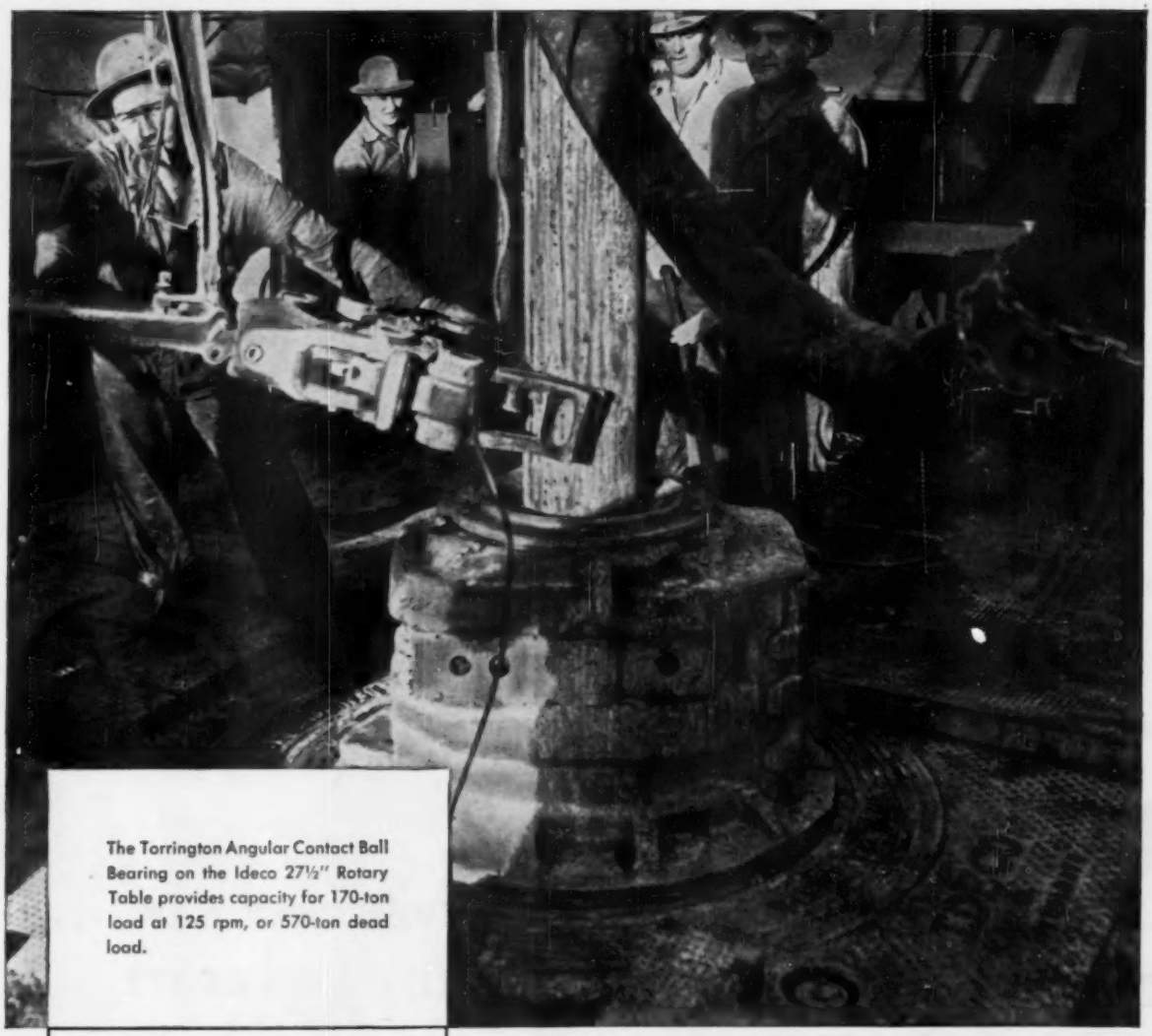

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The Ideco 27½" Streamlined Rotary, with its 570-ton dead load capacity and 170-ton operating capacity at 125 rpm, is equipped with a Torrington Angular Contact Ball Thrust Bearing to insure safe, speedy drilling.

These heavy-duty main bearings consist of thirty 3" hardened and ground steel balls mounted in precision-ground hardened steel races. A bronze retaining ring spaces the balls for even load distribution and smooth operation. Angular contact design enables the bearing to carry not only the high thrust load but also the radial load imposed by the driving gear.

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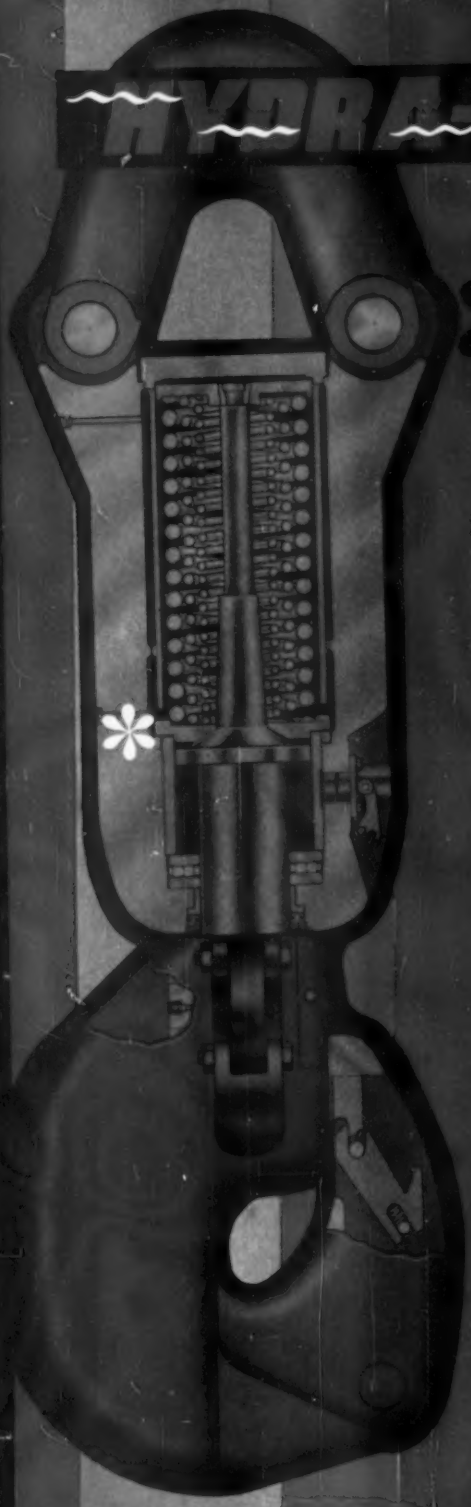

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They Say—

"Times" blasts gulf states

"For 20 years controversy has raged between federal and state governments over the immensely rich undersea oil resources stretching out from our coastline. The issue was partly settled in 1953, when Congress —most unwisely, in the expressed view of this newspaper—ceded to the states the right to control exploitation of offshore oil as far seaward as their historic boundaries. . .

"In his 1952 campaign President Eisenhower championed Texas' boundary claim. Now his administration is taking a different point of view. We are glad to see that the Government is trying to retrieve a little of the wreckage left by the Submerged Lands Act of 1953 by fighting the exorbitant demands of the gulf states which were well understood and fully expected at the time that give-away law was passed."

Editorial in the New York Times.

Independents overprotected?

"The independent producer already has adequate advantages by way of proration laws, conservation laws, and special tax privileges by way of intangible drilling cost and depletion allowance to more than offset the competition of imported oil.

"If the situation as to productive capacity and reserves in this country has achieved such high levels as to require restrictions on oil imports, then we no longer need the added federal tax inducements to add to the problem of oversupply."

Otis H. Ellis, general counsel, National Oil Jobbers Council, during a panel discussion on imports before a House ways and means subcommittee.

"Face the grim fact"

"There are encouraging signs of more balanced inventories in the air. . . The voluntary imports limitation program seems to be working . . . pipeline proration is being relaxed to a minimum. The industry must face the grim fact that demand for its products during the period, Decem-

VAPOR PHASE® THERMAL CIRCULATION PERMITS DOLLAR-SAVING REMOVAL OF JACKET WATER PUMPS

Steam is manifolded from three Clark Bros. 550 hp engines to a single VAPOR PHASE® Unit.

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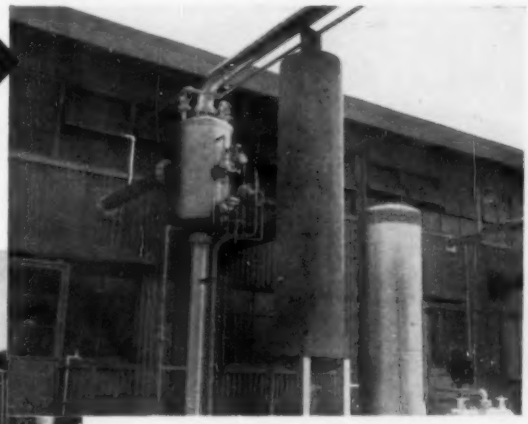
Steam from this VAPOR PHASE® Separator, as well as lube oil and compressor cooling water, are all cooled in aerial condensers.



The parasitic load of the jacket water pumps is completely eliminated by use of VAPOR PHASE® Thermal Circulation.

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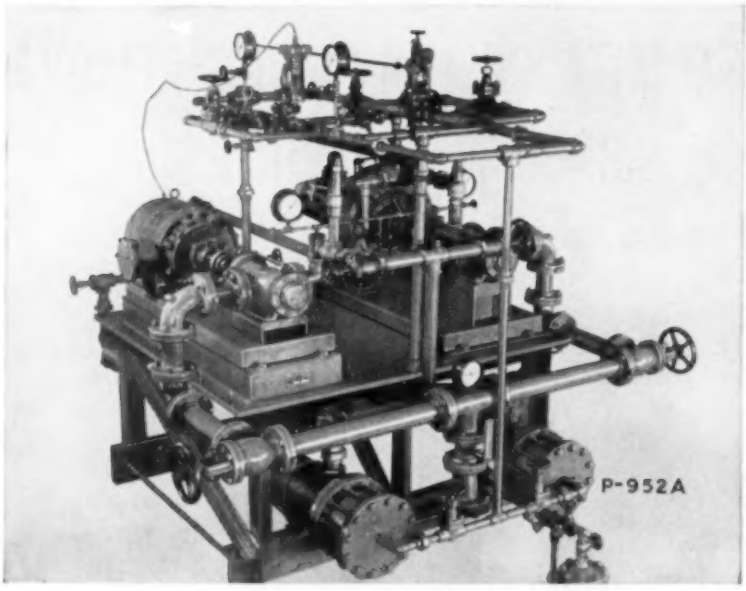

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ber 1957 to April 1, 1958, probably will be 350,000 bbls. daily below the similar 1956-57 period."

P. C. Spencer, president Sinclair Oil Corp., in a year-end statement.

Things are looking better

"Adverse developments beginning with the end of the Suez crisis last spring have completely demoralized product prices, softened the price of crude, and are squeezing profits . . . inventories seem to be headed slightly downward.

"The oil prospects for better markets seem today better than at any time since Suez reopened."

Gen. Ernest O. Thompson, chairman of the Texas Railroad Commission.

OCAW looks at oil-tax laws

". . . The self-made Big Rich are really tax-made. They have ridden to wealth through those numerous loopholes which special-privilege legislation has driven through the income-tax structure of the U.S., once a model of progressive tax legislation based on ability to pay. . .

"Among the biggest of these loopholes: The 'depletion allowance' of 27.5 per cent of gross income which the law allows tax-free on income from oil, either American or foreign.

"This allowance, first made in the Hoover administration, has resisted all reform for 30 years due to the political power of beneficiaries. It's one of the biggest tax avoidance holes and has been widely extended, though not so generously, through the whole range of minerals. It is making both big corporations and big fortunes bigger fast."

Editorial in the "Union News," magazine of Oil, Chemical, and Atomic Workers International Union.

Sorry, no reserve figures

"Estimates of oil reserves, as you know, are quite variable. They are made on standard formula basis, although there may be variations as between methods used by various companies.

"A figure giving only barrels of crude reserves can be misleading because oil quality varies widely. As well, it is common experience for our reserve estimates to vary considerably

from year to year as new knowledge is obtained."

J. R. White, president, Imperial Oil, Ltd., in a statement explaining why his company would not make its reserve estimates public.

Smears put arm in sling

"There is unquestioned value in the public airing of issues which affect the nation and the world . . . But there is unmeasured danger in the reckless charge hurled into television screens across the nation and into headlines across five continents.

"The oil industry, particularly, has suffered from this kind of irresponsible attack. It is subjected to a running fire of politically inspired charges which have hampered its ability to function with full efficiency at home and abroad, have undermined its prestige—and, which is worse, have damaged this nation's prestige among foreign countries.

"In its overseas operations, American industry has demonstrated that it recognizes its responsibilities as a symbol of the United States. It has made every effort to gain and keep friends wherever it goes, by acting fairly and conducting its affairs with honesty and dignity.

"Indeed, it has become one of the most potent and valuable diplomatic arms, paving the way for successful foreign relations by creating an atmosphere of mutual respect and trust."

The Texas Co., in a special message to stockholders and employes.

CALENDAR OF EVENTS

JANUARY

6-13 Short course on oil and gas law, sponsored by Southwestern Legal Foundation and Southern Methodist University School of Law, Southwestern Legal Center, Dallas.

11-12 National Oil Scouts and Landmen's Association, directors' meeting, Adolphus Hotel, Dallas.

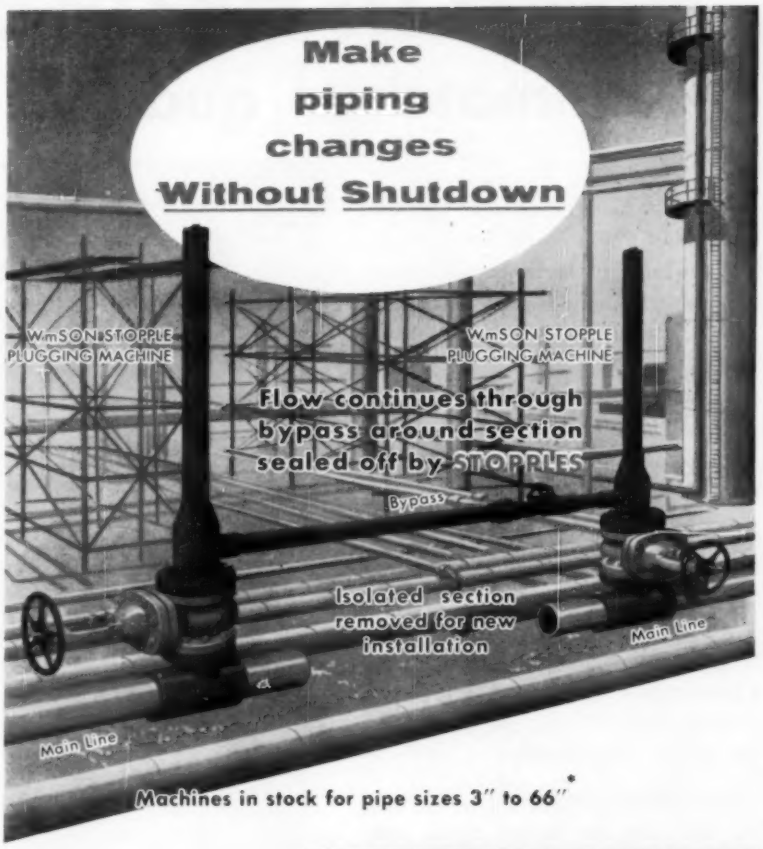
16-18 Association of Oilwell Servicing Contractors, second annual convention, Baker Hotel, Dallas.

19-22 Pipe Line Contractors Association tenth annual convention, Boca Raton Hotel and Club, Boca Raton, Fla.

20-21 Compressed Gas Association, Inc., forty-fifth annual meeting, Waldorf-Astoria, New York.

29-31 Ninth annual Institute on the Law of Oil and Gas Taxation, sponsored by Southwestern Legal Center, Dallas.

31 Natural Gasoline Association of America, regional meeting, Skirvin Hotel Oklahoma City.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FEBRUARY

3-4 Instrument Society of America, chemical and petroleum industry symposium on progress and trends in chemical and petroleum instrumentation, Hotel Du Pont, Wilmington, Del.

12-14 National Association of Corrosion Engineers, Tulsa section, ninth annual corrosion short course for pipeliners, Mayo Hotel, Tulsa.

13-15 National Society of Professional Engineers, spring meeting, Michigan State University, East Lansing, Mich.

16-20 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual meeting, Hotel Statler, New York.

26-28 American Petroleum Institute, Division of Production, southern district meeting, Shamrock-Hilton Hotel, Houston.

28 Natural Gasoline Association of America, Permian basin regional meeting, Lincoln Hotel, Odessa, Tex.

MARCH

3-4 Society of Petroleum Engineers of American Institute of Mining, Metallurgical, and Petroleum Engineers, fourth annual joint meeting of Rocky Mountain petroleum sections, Cosmopolitan Hotel, Denver.

5-6 Gas Conditioning conference, sponsored by the University of Oklahoma, Oklahoma Memorial Union Building, Norman, Okla.

7 Ohio Oil and Gas Association, winter meeting, Deshler Hilton Hotel, Columbus, Ohio.

10-13 American Association of Petroleum Geologists and Society of Economic Paleontologists and Mineralogists, forty-third annual meeting, Biltmore Hotel, Los Angeles.

12-14 American Petroleum Institute, Division of Production, southwestern district meeting, Hotel Texas, Fort Worth.

17-21 International Atomic Exposition, Inc., 1958 Nuclear Congress, Chicago Amphitheatre, Chicago.

17-21 National Association of Corrosion Engineers, annual conference, civic auditorium, San Francisco.

20-21 New England Gas Association, annual meeting Hotel Statler, Boston.

20-21 Society of Petroleum Engineers of American Institute of Mining, Metallurgical, and Petroleum Engineers, regional conference on production and reservoir engineering, Mayo Hotel, Tulsa.

24-26 Midwest Gas Association, Broadmoor Hotel, Colorado Springs, Colo.

31-April 2 American Petroleum Institute, Division of Transportation, annual pipeline conference, Jung Hotel, New Orleans.

APRIL

1-3 University of Oklahoma, fifth annual conference on corrosion control, Extension Study Center, Norman, Okla.

9-11 American Petroleum Institute, Division of Production, Mid-Continent district meeting, Biltmore Hotel, Oklahoma City.

13-18 American Chemical Society, national meeting, San Francisco.

15-17 University of Oklahoma, thirty-fourth annual gas measurement short course, North Campus, Norman, Okla.

16-18 Natural Gasoline Association of America, annual convention, Baker and Adolphus Hotels, Dallas.

16-18 National Petroleum Association, fifty-fifth semiannual meeting, Hotel Cleveland, Cleveland.

17-18 American Institute of Mining, Metallurgical, and Petroleum Engineers.

ONE MAN, and a "Varec" PULSE CODE System, can gauge and record 100 tanks in 12.3 minutes—AUTOMATICALLY

Quite a job for one man—and quite a saving for his employer. A saving in labor, time and overflow losses, and an increase in production efficiency. The secret, of course, is the "Varec" PULSE CODE equipment wisely specified by the farm operator. He has discovered what thousands of successfully operating "Varec" installations have been proving for years: that automation *means* reduced operating costs, and automation by "Varec" *guarantees* it.

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21-23 American Petro'eum Institute, Division of Production, Rocky Mountain district meeting, Cosmopolitan Hotel, Denver.

23-25 Second International Williston Basin Symposium, sponsored by Saskatchewan Geological Society and North Dakota Geological Society, Regina.

27-29 Independent Petroleum Association of America, midyear meeting, Hotel Sherman, Chicago.

27-30 American Association of Petroleum Geologists, Rocky Mountain section, Casper, Wyo.

28-29 University of Oklahoma, third annual conference on automatic control in the petroleum and chemical industries, Oklahoma Memorial Union Building, Norman, Okla.

28-30 Southern Gas Association, annual convention, Dallas.

MAY

5-6 Society of Petroleum Engineers of A.I.M.E., North Texas section, secondary-recovery symposium, Wichita Falls, Tex.

5-7 Purdue University, thirteenth annual industrial waste conference, Purdue Memorial Union Building, Lafayette, Ind.

5-9 American Gas Association, distribution, production, and transmission conference, Roosevelt and Commodore Hotels, New York.

7-9 American Petroleum Institute, Division of Production, eastern district meeting, Deshler-Hilton Hotel, Columbus, Ohio.

8-9 Texas Petroleum Research Committee, eleventh oil recovery conference, symposium on "A Century of Texas Oil, 1875-1975," University of Texas, Austin.

12-14 Chemical Institute of Canada, National Research Council, eighth Canadian high polymer forum, Macdonald College, St. Anne de Bellevue, Quebec.

12-14 Instrument Society of America, symposium of analysis instrumentation division, Shamrock Hilton Hotel, Houston.

12-16 American Petroleum Institute, Division of Refining, midyear meeting, Statler Hotel, Los Angeles.

20-22 Pennsylvania Gas Association, annual meeting, Pocono Manor Inn, Pocono Manor, Pa.

21-23 American Petroleum Institute, Division of Marketing, midyear meeting, Roosevelt Hotel, New Orleans.

22-23 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles.

26-28 Chemical Institute of Canada, annual conference and exhibition, Royal York Hotel, Toronto.

JUNE

8-11 American Petroleum Institute, Division of Transportation, annual tanker conference, Greenbrier Hotel, White Sulphur Springs, W. Va.

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the OIL AND GAS JOURNAL

TULSA, OKLAHOMA

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JOURNALLY SPEAKING

Oil's Orbit

IF THIS is the first page you always read in the Big Yel'ow Book you may not have noticed that this is our annual International Number.

Like a Sputnik, our editors take you around the world in 90 minutes or so, giving you a satellite-eye view of what's going on, petroleumwise, in every corner of our fast-shrinking globe. They've packed the facts in about as tight as a Vanguard moonlet's instrumentation. But their orbit doesn't allow for any comments.

Our own comment is my gosh, what a heck of a lot of people are looking for oil in what an awful lot of places.

Suppose they all find new oil supplies all at the same time. What'll we do with it all? Of course, as one of our articles points out, there's going to be plenty of tankers to haul it someplace, but where? Goodness knows we've got all the oil we can use in this country, and it looks like it will be that way for the next year or two. And just offhand we can't think of any countries that are crying for oil and can't find anybody who will sell it to them.

And just look at all the American operators who are poking around in foreign countries—not counting Canada. One might think that domestic producers are giving up hope of finding any more oil here. Or maybe they just figure that imports are here to stay and they want to play it safe by working that side of the street too.

We wish them all luck in finding oil—and in finding markets for it. But wouldn't it be a cruel joke on them if they abandon U. S. operations because market-demand proration prevents them from selling all they could produce, only to find that oil they produce abroad has just as hard a time finding a buyer?

If the world's producing capacity keeps expanding faster than its rate of consumption—as seems to be the case at the moment—it's not unreasonable to predict that somebody is going to have some trouble getting rid of the stuff. Maybe we'll have to come to new practices and new terms, such as "tanker proration."

There are bound to be some international conflicts over this. Such as the one now building up between the United States and Canada. Now there's a funny one—or at least it would seem funny to a man from Mars.

Canada has more crude oil and more natural gas than it can use itself. It is quite miffed at the U. S. because we don't want to buy any more of its oil. But it is also quite miffed because a lot of Americans want to buy more of its gas.

The Canadians seem to see something sinister in this attitude of Uncle Sam. They are trying to figure out some way to make us buy the oil we don't want and keep us from buying the gas we do want. Maybe that's reciprocal trade (which is a subject we never were too clear about). Anyway, the Canadians have appointed a Royal Commission to figure it out, and we can hardly wait for the answer.

That's just an example of the kind of problems an oil man is liable to run into when he gets into the international orbit. He may get fed up with the way things are going in this country and think that the foreign pastures look nice and green. But pretty soon he finds himself up to his neck in situations he never even thought of before. It's no wonder Secretary Dulles has to keep flying around the world trying to straighten out all these international problems.

It's quite an orbit, this course of international oil. About as complicated, in its way, as getting an earth satellite into its orbit.

The special stuff in this issue gives you a mighty good outline of the track of oil's international orbit, but can't begin to explain all the problems and how they may be solved. So you will just have to read every issue of our favorite oil publication. There are some interesting days—and years—coming up, and we'll report on everything around the world as fast as it happens.

—Henry D. Ralph.

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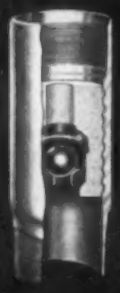

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Oil exports should be geared to market growth

NEW problems of economic statesmanship are arising out of the fact that oil is rapidly becoming far more of a truly international industry, in every respect.

Oil is being found in many new places around the globe, so much so that no producing country can dominate the export trade. And entrepreneurs, small as well as large, of almost every industrial nation are crossing national borders seeking a share in this international business.

With all this new competition and new discovery there seems little doubt that the world will be well supplied with oil for all its needs for many years into the future.

A WORLD SURPLUS may well be in the making. Of course, world consumption will increase rapidly. All peoples are depending more and more on petroleum products, and the potential expansion in global demand seems limitless. But during the next few years producing capacity seems likely to grow faster than consuming markets.

This reverses the international politics of oil. Past generations saw aggressive nations backing their nationals in bold ventures to gain foreign producing concessions. Now we may see surplus-producing nations backing aggressive operators in commercial wars to gain more markets.

The "have-not" nations will, of course, be in a much happier position as a result. But some who are partially self-sufficient in oil may feel that the health of their indigenous industry is endangered by the too-free availability of oil from external sources. Some barriers to free imports may appear.

The United States is already in that position. It is experimenting with an over-all ceiling on imports designed to keep its own industry from being swamped. The total effect of this on world trade is not great in number of barrels, but it is a reminder to the world's oil industry that oil demand is inelastic and grows in an orderly fashion.

THIS MAY FOREBODE a world problem of what to do with surplus crude. Experience has shown that the best solution is to keep it in the ground—keep it in the form of excess producing capacity rather than excess produced oil crowding storage facilities and forcing distress sales.

Producing nations faced with this problem would do well to study the system evolved by several of the states and provinces of the United States and Canada. They estimate the market demand for their crude and prorate production accordingly.

This doesn't stop growth of producing facilities nor competition for markets, but it makes both considerably more orderly and rational. It is simply realization by producers that they all suffer when they put on the market more oil than can be consumed at any given time.

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The OIL AND GAS JOURNAL

December 30, 1957

Refinery-Building Boom Goes Abroad

In the free world outside the U. S. refiners are:

1. Expanding rapidly. These refiners will pass the U. S. in crude capacity during 1958.
2. Stressing product quality with modern catalytic processes.
3. Looking forward to a fast rising demand. On percentage basis, foreign countries will need more energy than the U. S. in the next few years.

Here's How and Where Free-World Refining Will Grow

	Latin America	Europe	Middle East	Far East*	Africa	U.S. and Canada†	Free World
Crude capacity 1/1/58‡	2,643,635	3,022,960	1,260,730	1,088,500	100,400	10,600,000	18,716,225
New construction for 1958 completion	368,700	554,500	200,200	64,500	.....	400,000	1,587,900
Estimated capacity 1/1/59	3,012,335	3,577,460	1,460,930	1,153,000	100,400	11,000,000	20,304,125
Per cent annual increase	14.0	18.3	15.9	5.9	0	3.8	8.5
Contracted projects for 1959 and later completion	83,000	205,600	20,000	35,000	3,000	75,000	421,600
Planned projects not contracted	85,000	535,000	81,600	79,000	.....	90,000	870,600

*Includes Australia. †All figures estimated. ‡All figures in barrels per stream day.

George Weber
Refining Editor

THE FREE WORLD'S ENERGY appetite is being met abroad with a record refinery expansion program. Refiners in Europe, Latin America, and Asia are spending a billion dollars or more to boost capacity by nearly 1½ million barrels per day.

This looks like only the beginning. Energy needs are skyrocketing, and the most available source is going to be petroleum. As a result oil, and to a lesser extent natural gas, will get the lion's share of the potential market.

Within the next year, more than one million barrels per day will be added to the crude capacity of refineries in the free world outside the U. S. And firm commitments are made for more throughput in 1959 and 1960.

Beyond this loom more refineries. No less than 15 complete, grass-roots plants are now in the planning stage. They amount to about 800,000 bbl. per day in additional capacity. Some of these projects will fall by the wayside. But most of them are expected to start within the next year or two.

In this building boom abroad, the U. S. industry has an active part. Roughly 40 per cent of all new work is being financed by international oil companies based in the U. S. In addition, the new catalytic techniques finding use abroad are almost exclusively licensed by American companies.

The spurt in new capacity abroad is only part of the picture. It is being matched by an even larger program aimed at product quality. This investment will not add one barrel to refinery production.

The catalytic reforming, hydrogen treating, catalytic cracking, alkylation, and other such units now taking shape amount to a revolution in refining in many sections of the world. The net result will be a sharpened potential from Yokohama to Antwerp to Santiago, Chile, for higher-octane gasoline, better fuel oils, quality lubes, and asphalts.

U. S. lagging

This growth rate abroad is several times that of the U. S. refining industry today. In the U. S. a nominal in-

Product quality is the aim of today's refiner

Refining Capacity, 1-1-58*	Crudes	Thermal cracking	Thermal reform.	Catalytic cracking	Catalytic reform.	Hydrogen treating	Alky.	Poly	Asphalt	Lubes
Latin America	2,643,635	783,883	49,970	334,030	28,460	23,500	11,055	19,470	21,460	6,750
Middle East	1,260,730	29,020	158,450	57,300	39,150	28,950	11,000	3,050	11,457	900
Europe	3,022,960	119,800	213,220	477,250	201,710	70,960	.....	28,320	20,820	46,500
Far East and Australia	1,088,500	60,400	19,200	143,860	49,670	5,600	3,540	9,045	2,300	2,170
Africa	100,400	9,200	4,700	11,540	.....	.....	.....	1,725	1,130	.....
TOTAL	**8,116,225**	**1,002,303**	**445,540**	**1,023,980**	**318,990**	**129,010**	**25,595**	**61,610**	**80,347**	**56,320**
New Capacity Now Committed										
Latin America	451,700	51,000	0	110,300	17,350	10,000	3,400	500	6,000	3,620
Middle East	220,200	25,000	0	0	9,070	0	1,210	0	0	0
Europe	760,100	12,000	0	2,500	159,750	231,130	5,050	0	1,200	1,600
Far East and Australia	99,500	0	0	21,400	28,300	21,000	900	0	1,100	0
Africa	3,000	10,000	2,700	0	0	2,700	0	0	0	0
TOTAL NEW CAPACITY	**1,534,500**	**98,000**	**2,700**	**134,200**	**214,470**	**264,830**	**10,560**	**500**	**8,200**	**5,220**

*All figures in barrels per stream day.

crease in crude capacity of about 3 to 4 per cent is expected for 1958. Even this expansion is decried in many circles in view of the current domestic capacity excess.

But in the rest of the free world, the rate of expansion will run 14.5 per cent in 1958 alone. More is on the way. Altogether, today's operating capacity will be boosted 20 per cent or more by projects now firmly committed.

As a result, the U. S. refining industry will sometime in 1958 lose its historic position of having more than half of the free world's total refining capacity. One year from now, U. S. refiners will be operating about 10,000,000 bbl. per stream day in basic crude capacity. Refiners abroad, excluding U.S.S.R. and satellites, will have about 10,200,000 bbl. per stream day in operation.

Europe leads the pack

In all of the free world, Europe is showing the greatest burst of building activity. This new round of capacity expansion comes on top of a program which essentially rebuilt the European refining industry since World War II.

Some big increases in basic crude capacity are coming up as a result of work under way or firmly committed. Here's how the countries line up:

... **United Kingdom's** capacity will jump 46 per cent.

... **West Germany** is not far behind with a 43 per cent increase under way.

... **France** is adding 20 per cent.

... **Italy,** which has been very active in new refining, is adding another 15 per cent during the next year or so.

Much of this is in the form of new grass-roots refineries which will take shape from Oslo to Rome. Their makeup will match any U. S. refinery in catalytic reforming and hydrogen treating.

But catalytic cracking is getting very little attention in Europe today. Europe's economy is hungry for distillate and residual fuels. Actually, existing cat crackers are not being operated at capacity in some refineries. They were built to meet a rising demand for motor fuel. But the distillate-fuel market grew faster so there is less incentive to convert cat-feed stocks to gasoline.

As a result, European refiners will rest on new catalytic cracking capacity until their facilities have reached a better balance on distillate fuel and gasoline yields. The present level of catalytic capacity stands at 16 per cent of crude capacity. In the almost complete absence of any expansion, this level will decline as basic crude capacity continues to rise.

But if the yield of gasoline is dropping, its quality is following the opposite trend. Catalytic reforming is enjoying a widespread boom in Europe. Existing facilities run nearly 7 per cent of crude capacity. Before the current building program is finished, the level will rise to 10 per cent.

The dominant position of sour Middle Eastern crudes in Europe is giving rise to another boom—in catalytic hydrodesulfurization. This work-horse process is being used to desulfurize and otherwise clean up literally all of the distillate products in the plant.

Germany has led all countries in the use of hydrogen in petroleum processing. It has pioneered in the severe, destructive hydrogenation of heavy stocks and is now applying the milder techniques to other fractions. Hydrogen treating and hydrogenation units in West Germany average 13 per cent of crude capacity today. The level is going to 15 per cent on the present building program.

In France, Italy, and United Kingdom, hydrodesulfurization has barely begun to find use. But projects under way will raise this type of capacity to 4 per cent of crude capacity in France, to 5 per cent in Italy, and to 8 per cent in the United Kingdom.

Thermal reforming has long been popular in Europe. It still leads catalytic reforming in total capacity today. But the swing is generally toward the catalytic side this year. As new cat reformers supplant the less economic thermal capacity, this practice will decline except in cases where it may be used in combination to upgrade the lower octane fraction of split cat reformate. The first combination unit of this type anywhere in the world is located in Italy.

Latin American picture

Refiners in Latin America are following a pattern set in the U. S. There, catalytic cracking is on the upswing.

Until recent years, cat cracking was a rarity in this area. But today it stands at 12.5 per cent of crude capacity. Present construction will raise this figure to 14.3 per cent.

On the other hand, Latin American refiners have not yet embraced catalytic reforming and hydrodesulfurization to the extent that Europeans are adopting them. They are, however, becoming more self-sufficient in lubricating oil, asphalt, and petrochemical manufacture than they have been in the past.

The level of over-all refining in Latin America continues to rise sharply. Under way are new refinery units which will boost crude capacity by 17 per cent within the next 2 years.

Venezuela, Brazil, and Mexico are most active in this building program.

Venezuela is expanding to meet a growing export market while Brazil and Mexico need more capacity for their internal requirements. Argentina badly needs more refining capacity, but little in the way of new facilities is firmly scheduled.

Asia expanding, too

In the Middle East, a 17.5 per cent boost in crude capacity is taking shape. But auxiliary processing for upping gasoline yield and improving product quality lags the rest of the free world. This reflects the fact that Middle East refineries no longer process as high a fraction of crude for product export to nearby world areas.

Europe and Southern Asia, and even South Africa, now satisfy their own needs with new domestic refining capacity. Middle East refineries today enjoy their major market in the distillate and heavy fuels, primarily for ship bunkering.

This characteristic of Middle East refining is shown in the new capacity now being built in Kuwait. A huge new crude unit is going in to produce straightrun fuels. But no catalytic processing is scheduled at present.

Japan is today enjoying one of the world's biggest booms in petroleum products. Domestic demand is rising at the rate of about 30 per cent per year. The brisk building program in Japanese refineries is continuing, with catalytic reforming playing a prominent part in upgrading gasoline.

Who's paying the bill?

For the most part, the refinery construction boom abroad is being carried out by the large international oil companies. Governments are still an important factor, however.

A conservative estimate of the cost of new capacity now under way or contracted will total close to $850 million. This cost estimate is derived by expanding the capacity of various types of units by the current cost per barrel of daily capacity in various parts of the world. In the case of new grass-roots plants, the offsite facilities are included in estimates. But for expansion of existing plants, no estimate is made for other than the processing facilities themselves. Including such auxiliaries, the total current building program runs conservatively $1 billion.

The major and independent European oil companies closely match the international U. S. companies in these foreign investments. Each group is putting up roughly 40 per cent of the total cost. Governments, particularly in Latin America, are participating to the extent of about 15 per cent of the total. The remainder is being invested by the smaller non-European domestic companies, primarily in the Far East and Australia.

While new refinery construction stands at a high level today, it is not considered to be out of line with projected requirements in the next few years. Foreign energy requirements are rising rapidly, far faster on a percentage basis than in the U. S.

A continuation of refining expansion is firmly anticipated until 1975. All the free world is headed toward higher and higher consumption of energy in the forms of petroleum, coal, natural gas, hydroelectric, and, ultimately, nuclear power.

The ready availability of crude oil for many years to come, barring any major war, will give petroleum the edge in filling these future energy needs. In Europe alone, petroleum is expected to encroach generally on solid fuels and hydroelectric power in sharing the total energy demand.

In the United Kingdom, for example, a recent estimate shows petroleum increasing its share of energy supply from 17 per cent in 1955 to about 30 per cent in 1965 and 34 per cent in 1975. West Germany will depend on petroleum for 17 per cent of its total energy in 1965, and 23 per cent in 1975, as compared with 10 per cent in 1955.

The French petroleum industry will supply an estimated 36 per cent by 1965 and 43 per cent by 1975. Two years ago, its share was 25 per cent. Italy today relies most heavily on petroleum, which supplies about 37 per cent of its energy. This share will grow gradually to about 41 per cent by 1975, coupled with 23 per cent from natural gas. In all of the four major nations surveyed, nuclear energy by 1975 is estimated to share 4 per cent of the total energy market in West Germany, 5 per cent in France, 6 per cent in Italy, and 10 per cent in U.K.

European refiners are busiest

Country—	Barrels per stream day						
	Crude	Thermal cracking	Thermal reform.	Catalytic cracking	Catalytic reform.	Hydrogen treating	Poly
Austria	46,910	11,000	.....	.....	.....	.....	.....
Belgium	162,900	.....	6,350	25,300	750	.....	3,700
Denmark	635	.....	.....	.....	.....	.....	.....
Finland	18,000	.....	.....	6,000	3,400	.....	500
France	633,600	16,700	85,600	139,590	22,700	460	3,340
Germany	357,270	19,600	22,300	60,960	28,900	47,200	1,120
Greece	30,000	.....	.....	.....	8,200	.....	.....
Italy	580,595	30,500	39,170	46,500	60,660	2,000	4,150
Netherlands	349,000	29,000	17,500	66,000	7,500	12,000	950
Norway	1,800	.....	.....	.....	.....	.....	.....
Portugal	22,900	.....	.....	10,600	.....	.....	1,400
Spain	132,700	3,500	12,000	.....	16,000	.....	460
Sweden	47,850	1,000	6,300	.....	5,500	.....	.....
United Kingdom	638,800	8,500	24,000	122,300	48,100	9,300	12,700
Total cap., 1-1-58	**3,022,960**	**119,800**	**213,220**	**477,250**	**201,710**	**70,960**	**28,320**
New construction for 1958 completion	554,500	12,000	.....	.....	123,150	175,050	.....
Est. cap., 1-1-59	**3,577,460**	**131,800**	.....	.....	**324,860**	**246,010**	.....
Contracted projects for 1959 and later comp.	205,600	.....	.....	2,500	36,600	56,080	.....
Planned projects not contracted	*593,790	.....	.....	60,000	120,000	170,000	.....

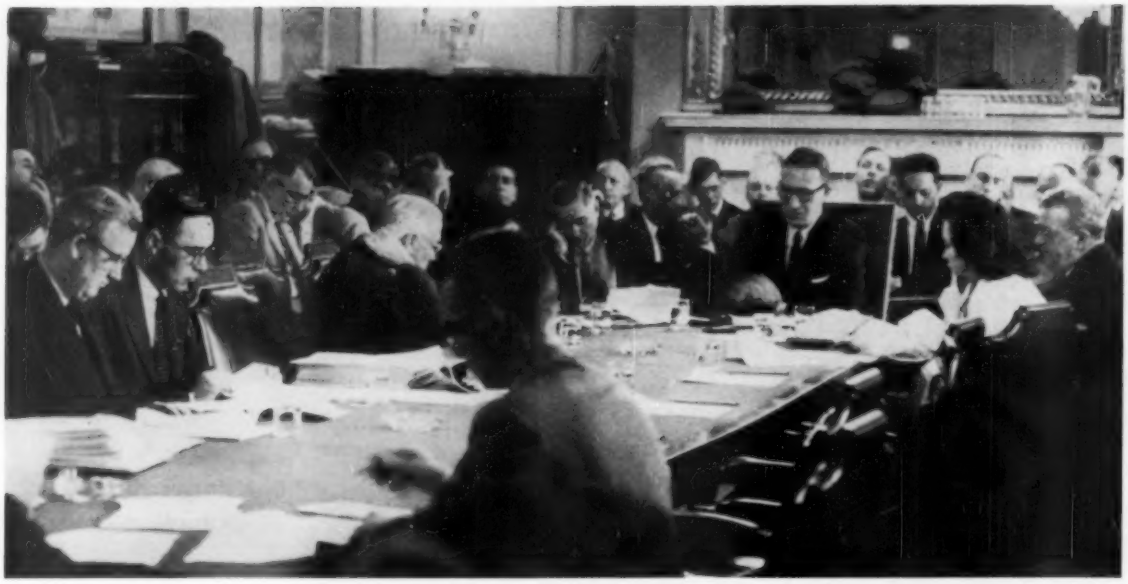
*Includes all projects proposed but not contracted, catalytic cracking, catalytic reforming and hydrogen treating capacities are estimated.

Details of International Refining

THE JOURNAL'S annual survey of international refining (beginning on page 123) has revealed this record building program throughout the free world. The returns showed two important trends. Crude capacity is rising rapidly. Refining in depth, for higher product quality, is attracting major attention abroad.

This survey covers all of the free world excepting the U. S. and Canada. These North American refiners are included in a separate survey now under way. Their firm figures on capacity at January 1, 1958, and for building plans will be published in the Journal's annual refining number in late March.

As a result, total free-world figures include estimates on Canada and the U. S., pending completion of the current survey.



Congressional probers will take another look at the industry soon.

Some Key Issues Are Before Congress

With the session just a week away, here's where oil stands: Harris bill has less than 50-50 chance to pass House; success of voluntary imports plan will influence action on Reciprocal Trade Act; and depletion on foreign oil may be cut in a move to get more revenue.

Bertram F. Linz
Washington District Editor

FINAL SESSION of the Eighty-fifth Congress will get under way at noon, January 7. And the industry will be looking closely for signs of the temper in which it will approach oil and gas bills.

A number of measures held over from the 1957 session will have to be disposed of before Congress quits next July. With one exception, their passage would be bad news for the industry. More of the same type will be offered in the next few weeks.

Topping the session's slate is a trio of subjects which the industry will watch carefully:

. . . **The Harris bill** to free independent gas producers from public-utility type regulation.

. . . **The depletion allowance** for oil and gas.

. . . **Extension** of the Reciprocal Trade Act.

But there is a handful of other bills which also could make for big changes in oil industry practices. How many will become law in the next 7 months is anybody's guess. Here's why: Politics, sputniks, and missiles will dominate the session. Much of what the congressmen say and do about oil and gas will be reaching for issues that will help them in the 1958 elections.

The November elections will be highly important. With all of the 435 House seats and one-third of the Senate's 96 up for grabs, the voting may show whether the next national administration will be Republican or Democratic.

When the Russians put their sputniks into the skies they knocked out all chances for any big tax cuts. The speeded-up missile program which resulted will cost maybe $2 billion more than the Government had planned.

Taxes, instead of going down, may go up—but in 1959 rather than 1958.

Gas bill's future dim . . . There is little talk of the Harris gas bill on Capitol Hill. The demands of the coal interests for changes in the measure have raised a new roadblock. But by far the most important factor is the recent court decision in the Memphis case (OGJ, Dec. 2, p. 70).

Observers put the bill's chances at much less than 50-50. Unless the coal-state congressmen get solidly behind it, there is slim prospect of House passage. The Senate didn't even look at the bill last session. It won't do so in 1958, either, unless the House approves it.

Many in the industry say that without a reversal of the Memphis decision the bill isn't worth much. In that case, the court held that gas pipelines must get prior acceptance of higher rates from all customers before asking the Federal Power Commission to approve them (see p. 116).

But any effort to get around that ruling, either by a clause in the Harris bill or a separate measure, will be fought by the distributing companies.

Depletion faces fight . . . Efforts to pare down the depletion allowance got nowhere last session. But the attack on the 27½ per cent rate will be renewed when the House ways and means committee opens its tax hearings the first day Congress is in session.

Actually depletion may get more tender treatment than in 1957.

The recent death of Rep. Jere Coo-

per of Tennessee, chairman of the House ways and means committee, will elevate Rep. Wilbur D. Mills of Arkansas to the top post on that powerful group next session.

Mills is much more in favor of depletion as an incentive than was the former head of the committee. He has expressed the view that it might be desirable to increase the 27½ per cent rate slightly, rather than reduce it, if it would spur the domestic industry to greater effort.

With the change in leadership, the committee is seen less likely to bear down heavily on depletion. But it is still expected that the allowance for foreign production will come under attack before the committee.

Witnesses who will appear during hearings starting January 7 are expected to urge the committee to cut the foreign allowance and to point out how much additional revenue could be secured by repealing the deduction now allowed for taxes paid to foreign governments.

The administration position on depletion will be made known about midmonth. Officials of a number of departments, including treasury and defense, are due to outline their views on tax changes.

The matter will come directly before the committee the following week, when witnesses from the oil and other natural resource industries testify.

Funds will be cut . . . The higher cost of military programs will bring cuts in government spending in other fields. The most likely targets are the Interior and Agriculture departments. President Eisenhower has said that "whole programs" will have to be scrapped. Many look for cutbacks in Interior's oil and gas research.

In only one field is Interior likely to get increased funds. The big missile program will call for large volumes of helium. The Bureau of Mines, with Defense Department support, is expected to ask the money for another extraction plant to cost over $10 million.

The administration's ideas on economy will be made known in the 1959 budget which will go to Congress in mid-January.

Imports, other bills . . . Oil imports will figure largely in the effort to extend the Reciprocal Trade Act. Only full success of the voluntary control program will avert a new drive for quotas. But in any event, producers will urge that clauses be written into the measure to insure that the effort to control imports is not relaxed.

Probably the most important of the other bills held over from the 1957 session is one requiring corporations to give 60 days advance notice of proposed mergers to the Justice Department and the Federal Trade Commission.

Another, given good chance of passing, would turn San Nicolas, San Miguel, and Prince Islands—off the California coast—into a naval petroleum reserve.

This would cover the area which the Navy planned to explore 3 years ago with a view to setting up a reserve if oil was found. Protests by West Coast interests brought a congressional inquiry and the department was denied the money it sought.

A measure of much importance to the industry is literally up in the air. This would overturn the Supreme Court decision in the Standard Oil Co. (Ind.) "Detroit case."

The court, several years ago, held that the cutting of prices to selected customers to meet competition in good faith was a sufficient defense against charges of price discrimination.

The issue now is before the court again. A new decision may be handed down shortly. If this affirms the previous opinion, the bill will be pressed. And if the court reverses itself but doesn't go as far as champions of small business want, it may still be a live issue.

There are several other holdovers, not given much chance of passage. These include bills to make all federal oil and gas leases subject to competitive bidding, set up a National Petroleum Commission, divorce marketing from refining, and finance programs for oil-shale research and the making of butadiene from surplus grain.

Tight schedule . . . Few of the new bills which will be written during the coming session will be considered by committees to be important enough to be wedged into their crowded schedules. But measures to amend a series of laws to take care of problems raised in operations on the Continental Shelf are likely to be taken up, when offered.

A crowded program and a desire to keep the session short will not, however, deter Congress from probing deeply into the operations of the industry.

Many of the investigations started last session are yet to be wound up. Others are in the making.

National Supply to Be Merged

DIRECTORS of Armco Steel Corp. and National Supply Co. have approved plans under which Armco will acquire National Supply, a leading manufacturer and supplier of oil-field equipment.

Final details of the merger still are to be worked out, but the move is considered a natural one for both companies.

Armco, seventh ranking steel producer, will pick up relatively little extra basic steel-making capacity. But National Supply's sales of finished products will increase combined sales of the merged corporation past the billion-dollar annual mark.

Only three other steel firms were above the billion-dollar mark in sales last year. They were U. S. Steel Corp., Bethlehem Steel Co., and Republic Steel Corp.

Armco has an ingot capacity of about 6 million tons annually. Its sales in 1956 exceeded $761 million mostly in hot-rolled and cold-rolled sheets, galvanized sheets, plates, wire rods, and wire.

Armco, however, has limited capacity in pipe and tubing of about 150,000 tons. National Supply would supply an outlet in these lines. It has annual capacity for more than 700,000 tons of seamless pipe and tubing, buttweld, lapweld, and electricweld pipe.

National Supply's steel-production is only about 50,000 tons of electric furnace steel. It has had to depend on open market for the rest of its steel.

Aramco has headquarters at Middletown, Ohio, and has plants there, at Ashland, Ky., Butler, Pa., Baltimore, and Kansas City. National Supply has headquarters in Pittsburgh, main pipemaking plants in Ambridge and Etna, Pa., and has about 130 stores in the U. S., Canada, and Venezuela.

Under the merger plan, stockholders of National Supply will receive 0.85 share of Armco for each share of National Supply. There are 2,934,892 common shares of National Supply outstanding and 11,992,415 shares of Armco outstanding on September 30, 1957.

Announcement of the merger plan was made by Charles R. Hook, chairman, and Ralph L. Gray, president of Armco, and A. E. Walker, chairman, and A. W. McKinney, president of National Supply. They reported National Supply will continue to operate as in the past and there will be no changes in policies of operating personnel.

U. S. Asks Heavy Import Cutbacks for

THE GOVERNMENT has set voluntary import allocations for the West Coast at 128,700 bbl. below scheduled imports for the first 6 months of 1958. The allocations also represent a 15 per cent cut from the average imports of the past 2 years for eight established importers.

The recommendation of the cabinet committee for the import-control program met with immediate protest from Canada, which fears the effect on western Canada production.

The plan was approved by President Eisenhower December 12, but formal announcement was held up until Canada and Venezuela were informed of its contents. White House sources declined to say whether either country protested.

Reports from Ottawa, however, said the Canadian Government would protest vigorously.

Canada "cannot accept" the view that the quotas on its oil are justified, Finance Minister Donald Fleming said. The government already has stated its objections and will continue to press them.

Fleming challenged a contention that the program would not result in a substantial cut in imports of Canadian oil. Impact of the program "may be expected to be adverse," he said.

The plan . . . The cabinet committee's import plan for the West Coast sets the allocation for 18 companies at 220,100 bbl. per day (see table). Eight companies are major importers, four are smaller importers, and six are newcomers to the field.

Here's How New Program Affects West Coast Importers

(Barrels daily)

Company—	1957 (estimated)	1958 (first half) (scheduled)	Allocation
Major Importers			
General Petroleum Corp.	27,500	27,400	25,500
Richfield Oil Corp.	19,900	26,900	9,100
Shell Oil Co.	48,200	35,000	32,500
Standard of California	47,800	55,200	29,700
The Texas Co.	26,400	28,500	20,600
Tidewater Oil Co.	46,000	51,000	37,900
Union Oil Co.	17,600	14,000	12,400
Wilshire Oil Co.	30,300	30,800	18,100
Smaller Importers			
Douglas Oil Co.	4,500	4,700	4,700
Fletcher Oil Co.	5,100	5,700	5,500
Mohawk Petroleum Corp.	.....	3,800	3,100
U. S. Oil & Refining Co.	2,000	11,700	4,000
New Importers			
Caminol Co.	.....	7,500	3,000
Edgington Oil Refineries	.....	3,000	3,000
Hancock Oil Co.	.....	3,600	3,000
Macmillan Petroleum Corp.	.....	2,500	2,500
Sunland Refining Corp.	.....	2,500	2,500
Superior Oil Co.	.....	35,000	3,000
TOTAL	**275,300**	**348,800**	**220,100**

The 18 earlier had scheduled 348,800 bbl. daily for the first half of 1958. In 1957, when seven did not import at all, the average was 275,300 bbl. per day.

For the eight established importers the import plan allows 185,800 bbl. per day, or 83,000 bbl. less than they had scheduled. Hardest hit are Standard Oil Co. of California, cut by 25,500, and Richfield Oil Corp., cut by 17,800.

Superior Oil Co. suffers the most among the new importers. It had scheduled imports of 35,000 bbl. daily in 1958 but was allocated only 3,000 bbl.

The cabinet committee explained its decision to extend the voluntary control program to the West Coast this

Some Importers Say They're Penalized by Cutbacks

STANDARD OIL CO. OF CALIFORNIA: "The suggested cutback involves an allocation to Standard Oil Co. of California that is drastically lower than we had anticipated, and time will be required to assess its effect on our situation. . . .

"We regret that it has been deemed necessary to impose these controls, and we hope that with reviving demands the Government will not consider it necessary to continue them. . . .

"We believe a base period of 1954-56, for which there is a precedent, would have been more equitable than the 1956-57 basis proposed.

"Nevertheless, as in the past, Standard Oil Co. of California intends to comply with suggestions of the cabinet committee, but we hope the committee sees its way clear to return shortly to freedom of imports."

RICHFIELD OIL CORP.: "It appears from a very quick appraisal of the recommendation that the operation of the formula prescribed cannot help but result in certain severe inequities, in that it would tend to penalize those who, like Richfield, have sought to correct the present situation by voluntary steps in 1957.

"In its statement made at the hearing held in Washington, November 25, Richfield stated it felt that the industry could put its house in order without government intervention and with the least inequity . . . Richfield is prepared to cooperate fully with any government program which takes cognizance of the equities involved."

WILSHIRE OIL CO.: "It is too early to evaluate the full impact of the recommendation as it pertains to Wilshire. However, at the moment it appears to be an extremely heavy cutback.

"We are not in favor of governmental regulation and control of the problem, which we feel can best be handled within the industry. Wilshire, as well as other responsible West Coast importers, have already voluntarily taken steps to reduce the current high inventory of crude oil.

"Wilshire will comply with the

West Coast

way: While District 5 continues to be an area where domestic output of crude oil and natural-gas liquids is inadequate to meet demand, the "level of imports should be that which supplements, rather than supplants, domestic production."

Had West Coast importers brought in their scheduled 348,800 bbl. daily over the next 6 months, there would have been a threat to national security and the long-term interest of the consuming public would not have been served, the committee said.

Basic data . . . Here is the supply-and-demand picture for the first half of 1958:

Estimated demand will consist of 541,000 bbl. daily of gasoline, 5,000 bbl. of kerosine, 208,000 bbl. of distillate, 315,000 bbl. of residual, 208,000 bbl. of other products, and 9,000 bbl. of crude. The total demand will be 1,286,000 bbl. daily.

Domestic supply will consist of 929,000 bbl. daily of District 5 crude, 80,000 bbl. of natural-gas liquids, 28,000 bbl. of crude from other districts, and 70,000 bbl. of products from other districts. The total: 1,107,000 bbl. daily.

This will leave a West Coast deficit of approximately 180,000 bbl. daily in domestic supply.

The committee said that since demand estimates are subject to greater change than those of supply, there should be some reserve for possible increases in demand. For that reason the import total was recommended at 220,100 bbl. daily.

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recommendations only insofar as it is economically feasible for the operation of our existing facilities."

GENERAL PETROLEUM CORP.: "We will comply."

TIDEWATER OIL CO.: The company "probably" will go along with the program.

UNION OIL CO.: Since the recommendation is only slightly below planned imports, the effect on refinery operations will be nominal, the company said.

SHELL OIL CO.: The company expects to make up the difference between its scheduled imports and the allocation with oil from the new Four Corners pipeline.

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watching WASHINGTON

. . . with Bertram F. Linz

• Federal plan for science study

A LONG-RANGE PROGRAM to spur scientific education will be laid before Congress by the administration next year.

Aroused by repeated warnings that the U. S. is lagging behind Russia in the production of scientific and technical personnel, government officials are working out a plan to put more vigor into our schools.

Nothing in the nature of a "crash" program is in the works. The whole idea is to beef up our educational facilities and attract students to scientific and technical careers.

The drive now shaping up will cost the Government, over-all, about $1 billion. The states would contribute up to half that sum in matching funds. The program would run for 4 or 5 years. After that, it is hoped, it would be kept going by the states themselves.

The project offered to Congress will be carefully worked out. It will be so framed as to avoid charges that it would lead to federal control of education. The administration's $1,500,000,000 school construction program was stalled by that charge.

• The atom competes with oil

NUCLEAR POWER may begin to cut into world oil demand in the next decade.

The atom promises to offer relief from rising fuel costs for countries which have little or no energy resources of their own. Hence, extensive use of atomic energy is most likely to come first in Europe.

Italy, where the fuel-cost problem is acute, already is moving into the nuclear field and may serve as a laboratory for the rest of Europe. The Italian Government now is working on a nuclear-power law and making plans to buy plants.

The western European countries face a number of oil problems which must be solved. Expected future increases in the cost of imported crude will strain their foreign-exchange position. Growing demand for fuel oil likely will leave them with a surplus of gasoline.

But the Suez crisis last winter also is having its influence. It showed that Europe is critically dependent—too much so for comfort—on a vulnerable Middle East supply.

The cost of power from nuclear fuel should be cut sharply by technical developments over the next few years. Once the gap between it and other fuels is closed, nuclear power will take hold in a big way.

• Tanker program rushes ahead

A VAST ship-building race is going on all over the world.

West German yards alone had more tonnage on order July 1 than was building in all countries on the same date in 1950.

World shipyards have more than 55 million tons of merchant vessels building or on order. When this is finished the world fleet will be double what it was when war broke out in 1939. And it will be nearly half again as large as it is now, the American Merchant Marine Institute reports.

Two-thirds of the new tonnage will come out of the yards as tankers. It will add 36.7 million tons to the present tanker fleet.

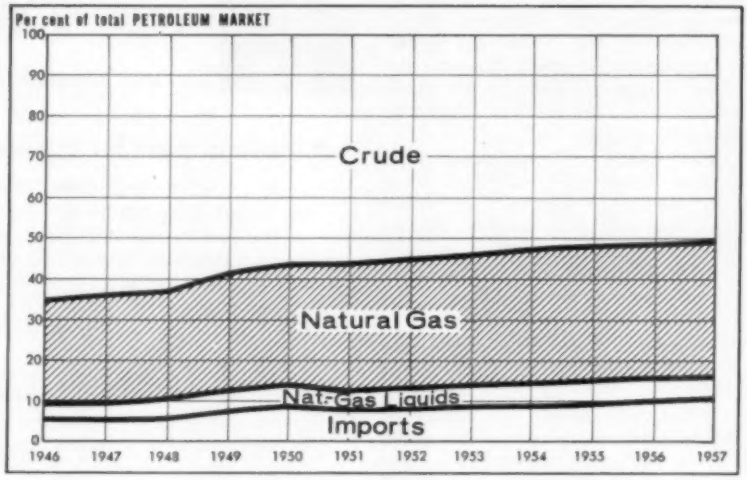
Marked changes have taken place in the tanker fleet since 1939. From less than 20 million tons at that time it has grown to almost 45 million tons now. When all ships now on order are built, there will be 81.6 million tons of tanker capacity afloat.

Only a small part of these new ships are being built in this country. But tankers building and on order in U. S. shipyards on November 1 totaled more than 3.5 million tons.

Gas Cutting Steadily Into Oil Market

● Imports have caught most blame for taking new markets from U.S. producers, but gas is an even bigger factor.

● As gas completes a record year, and looks ahead to an even bigger one, it's clear there's no simple solution.



A REVEALING fact is beginning to show through the tremendous growth of natural gas. It is shoving crude aside at many spots in the marketplace.

Gas, in fact, has presented oil men with a tough dilemma:

It furnishes added income for operators who produce gas along with oil. But the gas is taking over fuel uses long claimed by coal and oil and has become a major factor in softening the market for crude.

Many producers have overlooked these inroads from gas. They have been acutely aware of the market perils from foreign imports. Now the benefits of the new import-control program well may be offset by more natural gas moving into the hydrocarbons market.

Gas is an even greater factor than imports because it defies control. Gas production is not subject to proration to market demand. It usually is sold under long-term contracts. And it keeps coming to market in ever-growing volumes.

1. What's happening

The gas utility industry is just now closing its first $4-billion year. Prospects are that next year will be even better. Its 30-million-plus customers represent an all-time high. The industry spent $2 billion last year to meet growing requirements, expects to spend $8.7 billion in next 4 years.

The important thing for oil also is that reserves of natural gas are growing and the business shows no signs of slowing down.

What's going on is clearly seen by an analysis of the total hydrocarbons market since the war. This shows:

... **Domestic crude** in 1946 filled 65.2 per cent of the nation's total hydrocarbon fuel needs. It dropped to 50.4 per cent at the close of the third quarter this year. That's a decline of 14.8 percentage points.

... **Natural gas,** natural-gas liquids, and foreign imports all gained in market stature. But the greatest of these was natural gas. Its share of the market rose from 25.3 per cent in 1946 to 33.5 per cent this year. Lesser gains were made by natural-gas liquids—from 4.3 per cent to 5.6 per cent—and by imports—from 5.2 to 10.5 per cent.

This historic market shift was obscured by one trend: All the hydrocarbons showed good postwar gains in volumes. It's difficult to be pessimistic about these big volume gains:

... **Domestic crude** production—up from 4,750,500 bbl. daily in 1946 to 7,151,400 bbl. daily in 1957.

... **Marketed natural gas**—up from the equivalent of 1,841,000 bbl. daily to 4,591,000 bbl. daily in the same period.

... **Natural-gas liquids**—up from 317,100 to 785,900 bbl. daily.

... **Total imports**—up from 377,200 to 1,426,000 bbl. daily.

What these gains actually mean is this: Natural gas took a larger share of new business than domestic crude. Both natural-gas liquids and imports also bettered their market positions at the expense of crude.

2. The reaction

The spectacular jump in the volume of imports naturally attracted the most attention.

Domestic crude producers have been able to do something about the inroads made by imports. The voluntary control program was conceived as the answer. It just now is showing signs of bringing imported petroleum within prescribed limits (OGJ, Dec. 23, p. 32).

This circumstance may be fortunate because apparently there's very little that can be done to control natural-gas production. Gas is too closely associated with oil production for the two to be separated.

Oil men also often are gas men. Gas produced with oil can only be flared, returned to the reservoir to maintain pressure, or sold. Conservation authorities long have waged a battle against wasteful flaring.

There's a limit to gas repressuring. And if the gas is sold, it's contracted on a long-term basis requiring steady deliveries unrestricted by any proration to market demand.

So the oil man often has little choice but to send his gas to market even though it may squeeze the market for his crude.

Thus, it's not difficult to guess what would have happened to the domestic crude markets if this double squeeze from natural gas and unrestricted imports had continued.

The battle . . . The market fight between natural gas and oil gets hottest in the fields of fuel for heating and power generation.

Gas has carved out a commanding place for itself in both cases. In addition it has found important outlets as fuel for stationary internal-combustion engines. In many installations it has replaced diesel oil and gasoline.

Complaints from refiners and dealers all have one tune: Where gas is available at reasonable prices it is replacing furnace oil. The truth gener-

All Hydrocarbons Are Making Gains

Figures are in thousands of barrels daily. Gas is shown as crude-oil equivalent.

	Imports			Production			
	Crude	Products	Total	Crude	Nat. gas liquids	Nat. gas	Total
1933	87	37	124	2,481	93	710	3,408
1934	97	41	138	2,488	100	808	3,534
1935	88	56	144	2,730	108	875	3,857
1936	88	68	156	3,005	117	987	4,265
1937	75	81	156	3,505	135	1,099	4,895
1938	72	77	149	3,327	141	1,048	4,665
1939	91	71	162	3,466	142	1,131	4,901
1940	117	112	229	3,697	152	1,211	5,289
1941	139	127	266	3,842	222	1,284	5,614
1942	34	65	99	3,799	228	1,394	5,520
1943	38	136	174	4,125	240	1,559	6,098
1944	122	130	252	4,584	273	1,690	6,799
1945	204	107	311	4,695	307	1,789	7,102
1946	236	141	377	4,751	317	1,841	7,286
1947	267	170	437	5,088	362	2,092	7,979
1948	353	161	514	5,520	401	2,344	8,779
1949	421	224	645	5,047	430	2,475	8,597
1950	487	363	850	5,407	499	2,868	9,624
1951	491	354	845	6,158	561	3,405	10,969
1952	573	379	952	6,256	611	3,649	11,468
1953	648	386	1,034	6,458	654	3,834	11,980
1954	656	396	1,052	6,342	691	3,992	12,077
1955	782	466	1,248	6,807	771	4,294	13,120
1956	934	492	1,426	7,152	786	4,591	13,955
1957 (first 9 months)	1,002	529	1,531	7,276	801	4,845	14,453

ally is that burner installation and maintenance costs are lower with gas.

Throughout the country real estate developers in many cases have awaited the availability of gas before putting on new adidtions. Houses are more attractive to buyers with natural gas than with any other type fuel.

Gas has several other advantages for heating uses. It is clear, convenient, requ'res less processing and less storage by the user.

Large industrial fuel users also are finding gas attractive as an alternate fuel in the summer. Gas then often is offered them at cheaper prices. The reason for this is the necessity for gas-transmission companies to operate their pipeline at near capacity the year round. When heating demand for gas slumps in warm months, pipelines have to find large customers to take up this slack or close down their lines.

3. Effect on refiners

The bearish effect of gas on distillate and residual oil markets has forced refiners to change operations.

They now operate plants to produce only a minimum of heavier products. Coking has been substituted for residual operations.

Adjustments a'so have been made in all types of cracking operations to obtain the greatest yields of gasoline. This means the refiner needs to process less crude to serve the same market, and this restricts the producer's outlet for his crude.

4. The gas outlook

The gas industry is confident its spectacular expansion will continue.

The American Gas Association reported last week that current construction expenditures total $2 billion a year, 97 per cent of it for natural-gas faci'ities. Expenditures for the gas utility and pipeline industry for the 4-year period through 1960 will total $8.7 billion. This compares with $5.3 billion spent in the previous 4-year span.

The list of customers is still growing. Natural gas served 27 million customers this year, a gain of 1.8 million or 7 per cent over 1956 business. This gain was even more impressive in house heating. Customers have averaged 18 million this year, an 8 per cent increase, and should reach 20½ million by the end of 1959. Gas-heated homes now represent about 36 per cent of the nearly 50 million occupied homes and apartments in the nation.

Revenues from gas utility and pipelines sa'es to ultimate consumers reached an all-time high of $4,014 million, a 4.2 per cent gain. Natural gas revenues increased 7.4 per cent to $3,676 million.

The AGA report also detailed these highlights for 1957:

... **Underground storage** reached a new high of 1.5 trillion cubic feet with an ultimate capacity for 3.4 tri lion cubic feet. Facilities now represent 20 per cent of the industry's total requirements for its biggest demand day of the year.

... **Mains** totaling 21,000 miles were added in 1957, bringing total mileage to 545,700. The gas industry has extended its mains 200,000 miles in the past 10 years.

... **Promotion,** advertising, and research cost $3.25 million under a coordinated program. Research activities centered on gas air conditioning and domestic incinerators.

Robert W. Otto, AGA president, summed up this glowing year-end report by saying: "The gas utility and pipe'ine industry is confidently building for the future because millions of Americans are depending on gas for present and future needs."

All of which may not be too cheery a message for the crude producer.

Drillers Not Eligible

. . . to join a union. NLRB rules they are supervisors and cannot organize. Ruling is crucial in Permian basin drive.

DRILLING CONTRACTORS have gained another important victory over organized labor in the Permian basin.

The National Labor Relations Board has ruled that drillers employed by Carl J. Westlund Drilling Co. and Laughlin-Porter Drilling Co., both of Midland, Tex., are supervisors—and thus are not eligible for union membership.

The ruling deals a heavy blow to efforts of Local 672 of the International Union of Operating Engineers to organize the drilling crews of basin contractors—perhaps a death blow.

The union already was reeling from setbacks suffered earlier this month when employes of two well-servicing contractors voted against union representation (OGJ, Dec. 9, p. 63, and Dec. 16, p. 62). The outcome of the balloting was considered indicative of the way employes of the drilling contractors themselves would vote in union-sought elections in the coming months.

Driller hires crew . . . The latest NLRB decision was called a crucial one for both sides. This is because it is common practice for a driller to furnish his roughneck crew. He thereby acts, in effect, in a hiring capacity for the contractor.

If NLRB had ruled that the driller is not a supervisor, it would have had the effect of making roughnecks captive members of the union. No union driller would have a nonunion roughneck on his crew—and the union's recruiting job would be greatly simplified.

The hearings on the supervisory status of drillers on the payrolls of the Westlund and Laughlin-Porter firms were held by an NLRB examiner in Midland early in October. The testimony was reviewed by the board itself in Washington prior to decision.

The contractors based their argument primarily on the driller's "hiring capacity." The union argued he is not a supervisor because he does manual labor.

Not the end . . . The board decision applies only to the driller employes of the Westlund and Laughlin-Porter firms, but other contractors believe a precedent has been set.

The belief is that the board will rule similarly in cases involving other contractors because conditions would be virtually identical.

The union, however, is pushing ahead anyhow. It contested the driller issue again December 18 and 19 in hearings in Midland involving Forster Drilling Co., Odessa, and A. W. Thompson, Inc., Houston.

Forster contended its drillers are supervisors because each:

. . . Is in charge of an 8-hour shift.

. . . Hires and fires his men and arranges for their transportation to and from the rig.

. . . Buys tools and fuel on behalf of the contractor.

. . . Knows all machinery intimately and must be technically qualified to operate controls which regulate bit penetration.

Union spokesmen argued conversely that the driller:

. . . Works by the hour, in contrast to monthly salary paid tool pushers.

. . . Does manual labor.

. . . Sometimes works as roughneck.

The union drew admissions from Forster spokesmen that most drilling procedures are routine, then attempted to show that almost any member of a four-man crew could handle the driller's duties.

Canada Gas Policy

may be delayed until Borden group finishes 2-year job.

CANADA'S new Progressive Conservative government may take 2 years to decide whether it will permit export of natural gas.

Reason for the long wait is that the special Borden Commission may require 2 years to complete its work. The commission recently was created to study all phases of energy in Canada.

There had been hope the commission would issue an interim report, but Commission Chairman Henry Borden said this is not the intention. The position of representatives of all energy sources will have to be determined before a report can be made.

The commission will open hearings in January.

Prime Minister John Diefenbaker has said the government's stand on gas exports will not be announced until after the report has been studied.

The status of the export program of Trans-Canada Pipe Line Co., Ltd., also is unsettled. Borden said his commission was not asked specifically for a report on Trans-Canada's plan to export 200 million cubic feet daily of Alberta gas to the U. S.

"That is not in our lap at all," Borden said.

Arthur Smith, Progressive Conservative member for Calgary and a former oil executive, had suggested earlier that the commission issue an interim report on gas and oil so that the government could decide a course of action.

Propane Price Up

to 5 cents, responding to sharp cuts in inventories.

PROPANE PRICES have bounced up another ½ cent to match last year's winter high of 5 cents per gallon. The new increase, which applies to all areas except the eastern seaboard, is the third since summer.

The first ½-cent boost came in September when the 3½-cent summer discount rate was ended. Another increase in November pushed the price to 4½ cents per gallon.

Withdrawal of propane from storage has been at a much greater rate so far this season than last year and the year before.

Companies reduced stocks by 58,000,000 gal. in November compared with a reduction of only 23,000,000 gal. in November 1956. Several companies also reported heavy withdrawals during the first part of December.

Big reason for the heavier pull on inventories has been an early winter season which brought below-average temperatures to most of the nation in October. In contrast, last year's winter was warmer than average.

One company said that although withdrawals have been at a much greater rate so far this season, there is enough propane in storage to meet a heavy demand the rest of the season.

However, transportation could affect supply in some areas in case of an abnormally cold winter. Most underground storage is in the producing areas and not in the big consuming areas.

Storage of propane this year is at a record high. The industry met the heavy-demand season with 616,150,000 gal. on hand October 31. This is much higher than the peak storage of 500,250,000 gal. on hand October 31, 1956, and almost double the 1955 peak of 326,056,000 gal.

Alberta Bids Rise

for January despite a drop in demand by U.S. refiners

DESPITE decreased demands by U. S. and Ontario refiners, production of Alberta crude will show an upward spurt in January.

Nominations total 344,527 bbl. daily for the month, an increase of 45,605 bbl. daily over December but 97,104 bbl. below the nomination for last January.

The higher trend is credited to the fact that refinery turnarounds are nearly completed. Also inventories of most companies have been cut to favorable levels, and operators are starting to increase stocks of refined products.

Demands of western U. S. refiners dropped from 56,886 bbl. daily in December to 50,886 bbl. daily in January. Needs of eastern U. S. refiners were down 774 bbl. daily from the December figure of 19,485 bbl. daily.

Imperial Oil, Ltd., again topped the nominations list with a demand of 111,045 bbl. daily for refineries in Alberta, Saskatchewan, Manitoba, Ontario, and British Columbia. British American Oil Co., Ltd., nominated 60,925 bbl. daily for its refineries in the same provinces.

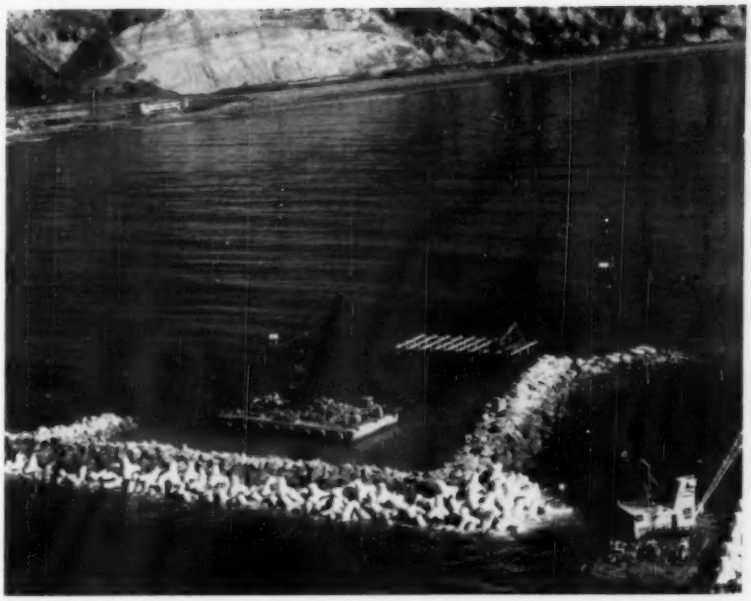
General Petroleum Corp. nominated 23,600 bbl. daily for its Ferndale, Wash., refinery, topping the list of U. S. bidders. Shell Oil Co. is asking 21,000 bbl. daily for its Anacortes, Wash., plant.

Other U. S. refiners and their nominations are: International Refineries, Inc., Wrenshall, Minn., 8,065; Texaco Exploration Co., 6,061; Bay Refining Corp., Bay City, Mich., 5,000; Lake Superior Refining Co., Superior, Wis., 5,000; Dow Chemical Co., Midland, Mich., 323; West Branch Refinery, West Branch, Mich., 323; and Union Oil Co., Cut Bank, Mont., 225.

Kellogg Has New Process

THE M. W. Kellogg Co. is now offering a continuous process producing acetylene and ethylene from naphtha or natural gas. Originally deve'oped by Ste. Belge de l'Azote (SBA), Liege, Belgium, the SBA process was further perfected in cooperation with Kellogg.

When naphtha is used as a feed stock, the process makes ethylene and acetylene simultaneously. Flexibility permits control over a wide ethylene acetylene ratio. When natural gas is used as feed, the process produces acetylene plus negligible quantities of heavy impurities.



Drilling Island Rises From Pacific

AN ARTIFICIAL ISLAND is taking shape in Pacific waters just off Rincon, Ventura County, California, where Richfield Oil Corp. plans offshore-drilling operations.

Crews have almost completed the preliminary fill. The photo above shows how 32-ton, white tetrapods are used to anchor huge rocks required to withstand severe wave action on the west side of the island. Richfield plans to have a rig drilling from the island by midsummer. The company has a 1,175-acre lease and can drill up to 70 wells from the acre island located in water 45 ft. deep and ½ mile offshore.

Besides this island, Richfield has another tentative island site mapped ½ mile farther out.

Navajo Leases Are Challenged

. . . because of old placer claims. Interior impounds bonus money on costly Four Corners tracts. Legal battle seen.

A LENGTHY legal battle is in prospect over four of the hottest tracts of Navajo Reservation land leased for oil development at a recent sale in Window Rock, Ariz.

Title to the tracts is clouded by 64-year-o'd placer-mining claims.

John Archer, Salt Lake City lease broker, has asked the Interior Department to determine the validity of placer claims filed on 3,800 acres of land between 1893 and 1897. Archer holds the deed to one of the claims and has located others who have deeds on claims scattered throughout the reservation.

Archer argues the placer-mining rights are still valid and that the land is public domain, not part of the Navajo Reservation. He hopes to patent the claims and gain rights to all minerals underlying the claims.

Part of the Navajo Reservation was established in 1905, and the balance in 1933.

The land in question is in the Montezuma Creek Canyon area of southeastern Utah, a few miles west of the Colorado border. Record high bonus bids were made on the four tracts at the December 10 sale.

Carter Oil Co. bid $1,034,000, or $4,308 per acre, on one tract and $305,244, or $1,907 per acre, on a second tract. On two other tracts The Texas Co. bid $486,564, or $3,041 per acre; and Phillips-Aztec bid $780,000, or $3,900 per acre.

The Interior Department's Bureau of Indian Affairs has ordered that the bonus money on the four tracts, plus any future royalties, be impounded until it can be determined definitely the tracts are inc'uded in the Navajo Reservation.

Tribal Attorney Norman Littel said the order is "utterly unacceptable to the tribe, and that in the view of the tribe it is null and void and of no force."

An Esso refinery worker grins, gets his shot. Industry's . . .

Flu War Isn't So Bad

THE ASIAN FLU BUG bit the oil industry only lightly during 1957, but warnings are out that the pest may be back again in early 1958.

The Journal asked a score of oil companies over the nation what the Asian flu "epidemic" did to their work forces during its peak months of October and November. The verdict:

. . . **Absenteeism** was well above that of comparable months of 1956, but in no place was it enough to cripple an operation. In some spots, such as the West Coast, there was little increase in absenteeism if any at all.

. . . **Most companies** gave their employes free inoculations to combat Asian flu. The programs met with varying success. In some places the vaccine was late arriving and did little good.

. . . **Some companies** are ready to start another round of inoculations for the early months of 1958 if conditions warrant.

Opinions of company medical officers differ as to the total effect of Asian flu among employes. One West Coast medical director pooh-poohed the so-called epidemic and said many people who came down with anything at all blamed it on the flu bug.

But in Tulsa, officials of one large oil firm cited figures showing absenteeism 163 per cent greater in November than in the same month of 1956. Just how much could be blamed on the flu was anybody's guess. Nearly nine-tenths of the employes received shots, but the medical officers question whether the shots did any good.

Companies were unable to keep accurate tab on the number of Asian flu cases because the rigid tests for the disease usually were not made. In listing the cause of illness, where available, most companies usually blanketed a number of diseases into the general "respiratory" class and let it go at that.

Despite the many "ifs" and "buts" involved in checking Asian flu, there is little doubt that the oil industry along with other segments of the business world experienced more absenteeism this past fall than usual.

Virtually all companies gave free inoculations, and most employes took advantage of the offer. In one company where a "nominal" charge of $3 was made, the response was poor. One major company declined to describe its inoculation policy because, it said, the medical profession has opposed company-sponsored vaccine programs. By taking large amounts of vaccine, the companies left little for private physicians.

Officials in Washington are avoiding any "scare" talk, but they point to the distinct possibility of another wave of Asian flu. The Public Health Service is stepping up its vaccination campaign as a protective measure.

The October-November surge has now subsided, but PHS says there is often a recurring wave in epidemics. The 1918-19 flu epidemic struck in waves.

Between 15 and 20 million persons have had the flu so far. New cases currently are on the downgrade—about 200,000 per week.

Annual Journal Index To Be Available Soon

THE Oil and Gas Journal's index of stories and articles printed during 1957 will be ready for distribution in January. It's free to Journal subscribers.

If you want a copy, send a postcard to The Reader Service Department, The Oil and Gas Journal, Box 1260, Tulsa, Okla. The index will be mailed just as soon as it's printed.

Proposed Gas Line

to St. Louis hits FPC snag. Application will be refiled.

PROMOTERS of an Oklahoma-to-St. Louis gas line, thwarted in their initial application, announce they will refile with the Federal Power Commission.

The FPC rejected a letter of application from Mookl Chemical & Gas Corp., Tulsa, and Missouri Transmission Corp., Springfield, Mo. Company officials explained that they had filed under an old procedure which was no longer acceptable. They outlined the project only in general form with the idea of filling in the required engineering, market, and reserves data by the time the case was heard.

"We are definitely going to refile," a company spokesman said in Tulsa. "The filing on the wrong form was an error on our part. We have had our engineers working in the meantime and will have our application firmed up next month."

Mookl proposes to build a 16-in. line from central Oklahoma to the Missouri line in Delaware County, Oklahoma. Missouri Transmission would build a 16-in. line from that point to the St. Louis area (OGJ, Dec. 2, p. 61). Missouri has asked for exemption from FPC regulation on grounds it is an intrastate line.

The companies claim a firm market for 150,000 M.c.f. daily, including service to Missouri communities and an atomic-energy plant near St. Louis. No sales in St. Louis itself are planned, according to company officials.

Jersey Stock Sells

quickly, leaving less than 1 per cent for outsiders.

IF THE WORLD'S economists need any further indication of the investing public's confidence in oil, they got it last week from stockholders of Standard Oil Co. (N.J.).

Jersey offered its stockholders $288,161,456 worth of new common stock in its first public financing in nearly 30 years.

Stockholders grabbed 99.18 per cent of the offering at $44 a share. This left the underwriters only 53,196 of the 6,549,124 shares to sell at the current market price of $49.75.

The success of the Jersey offering came on the heels of similar investor enthusiasm for oil securities in Europe and Latin America (OGJ, Newsletter Dec. 23). It will also be encouraging for the management of the Royal Dutch-Shell Group, which plans a mammoth public offering of stock next month.

Royal Dutch Petroleum will raise between $225 and $250 million with its stock offering. The sister company, Shell Transport & Trading, will raise another $112 to $154 million a short time later. In a prospectus issued last week the group estimated its world-wide oil reserves at slightly less than 13.5 billion barrels.

Leases in Alaska

granted Three States firm. Exploration will be delayed.

INTERIOR DEPARTMENT has awarded Three States Natural Gas Co., Dallas, 93,000 acres of leases and options on another 100,000 acres in scattered blocks in Alaska.

The company has either leased or optioned:

... **46,080 acres** near Chignik on the Alaska Peninsula.

... **43,620 acres** near Ugashik, also on the peninsula.

... **30,720 acres** near Dillingham on Bristol Bay.

... **23,040 acres** in the Talkeetna area.

... **48,640 acres** in the Gulkana area near the Copper River.

Three States plans no early exploration program. Everett Jenkins, executive vice president, indicated the company will "sit" on the acreage for the present and keep an eye on exploration results in surrounding blocks. Several major companies have filed on properties adjoining the Three States blocks.

Pipeline briefs

Texas-Illinois Natural Gas Pipeline Co. beat the timetable in completing its new 52-mile, 36 and 34-in. project between Morris, Ill., and suburban Chicago. Midwestern Constructors, Inc., Tulsa, got the big pipe in the ground ahead of schedule despite wet weather which shut down the spread for about 2 weeks.

Midwestern averaged about 4,000 ft. per 10-hour day and sometimes laid 6,400 ft. The line, which is mostly 36-in., cut through farm land for the most part and made two major crossings of the DuPage River of 700 and 400 ft. The project was started September 30.

The Oklahoma Corporation Commission has recessed until January 8-9 the Gulf Oil Corp. contempt hearing.

Gulf completed its defense during 4 days of testimony last week at Oklahoma City, but the state still has several witnesses to present. The commission has charged Gulf with failing to ask permission to cut purchases below the allowable for August and September.

Such issues as imports and Gulf contracts with other companies were injected into the case last week. Outcome of the case is important to the industry because it may set precedent for a new kind of state regulation. If found guilty of contempt, Gulf will appeal to the courts.

Pioneer Gathering Systems, Inc., last week completed 70 miles of mostly 12 and 16-in. pipe in Val Verde, Schleicher, and Sutton counties, Texas. The $4,500,000 project provides an outlet for 60,000,000 to 70,000,000 cu. ft. of gas daily. Much of this volume is oil-well gas which has been flared. Pioneer will deliver the gas to Permian Basin Pipeline Co., a subsidiary of Northern Natural. The purchase contract covers up to 200,000,000 cu. ft. daily when available. R. H. Fulton & Co. had the contract on this line.

Trans Mountain Oil Pipe Line Co. deliveries increased sharply to 102,000 bbl. daily this month, but were still below the average of the past 2 years. The pipeline's business has been off because of refinery strikes, turnarounds, and loss of its offshore market. The December deliveries compared to 80,049 bbl. daily for November. Deliveries averaged 159,617 bbl. for 1957 and 126,444 bbl. for 1956.

Britamoil Pipe Line Co., Ltd., has laid a line to Kabob field in Alberta although only two wells have been completed so far. Britamoil connected the promising field with the Peace River Oil Pipe Line to Edmonton with a 12-mile, 8-in. line joining the trunk near Fox Creek. Phillips Petroleum Co. and California Standard Co. operate the Kabob producers.

Skelly Oil Co. is winding up a 50-mile, 12-in. construction job on its main crude line in Kansas between Cunningham and Burton stations. The project is a modernization of existing facilities. The new 12-in. replaces an 8-in. main line looped with 6-in. Groninger & King, Pampa, Tex., had the construction contract.

Northern Natural Gas Co.'s 85-mile looping program scattered from Sunray, Tex., to Sioux City, Iowa, is in its final stages. R. H. Fulton & Co., the contractor, has moved to Perryton, Tex., to wind up the job. Completion is expected within the next month.

Sinclair Oil & Refining Co. is ex-tending its 33-mile, 8-in. pipeline from the Aguasay producing area in eastern Venezuela 9.4 miles to the Amana-Travieso pump station. Construcciones Cantaura, the contractor, expects to complete the project in January. The line, started up at 4,250 bbl. daily, will handle increasing volumes of crude as development proceeds in the deep field. Aguasay field feeds the 16-in. Amana line which transports crude from the Santa Barbara area to Puerto La Cruz.

Cities Service Gas Co. has awarded a contract for 17 miles of 26-in. in Kansas to R. H. Fulton & Co. This job is expected to be handled by one of two Fulton spreads working on Cities Service's 77-mile, 30-in. looping between Independence and Welda, Kans. The 30-in. construction will be completed sometime in February.

Seaboard Oil Co. and Charles B. Wrightsman, Houston producer, have received a FPC examiner's approval to sell gas from the Maurice area in Vermilion and Lafayette parishes, Louisiana, to United Gas Pipe Line Co. Examiner Daniel J. Kelly rejected FPC staff recommendations that certificates be conditioned to a starting price of 18 cents an M.c.f., including 1 cent gathering tax. The contract price is 19.5 cents, including the tax. Escalation clauses will raise the price to 23 cents in 15 years.

Gas Project Delayed

. . . by Memphis decision. Three firms call off $182 million Beatrice pipeline project because of financing difficulties.

THE MEMPHIS DECISION—newest legal thorn in the side of the natural-gas industry—has recorded its first casualty.

Scarcely a month ago the U. S. Circuit Court of Appeals in Washington ruled that a pipeline must gain prior customer approval of rates (OGJ, Dec. 2, p. 70). That decision has already upset the timetable of a $182-million project planned to increase gas deliveries to Chicago. And responsible company and federal officials believe several hundred million dollars in planned construction will be held up.

With rates up in the air, and no assurance of sufficient revenue to retire bonds, lenders are dubious about financing new projects.

What's at stake . . . The impact of the court decision is exemplified by the so-called Beatrice project, which would increase supply to gas hungry Chicago by 485,000 M.c.f. daily.

This project is sponsored by Natural Gas Pipeline Co. of America, Pacific Northwest Pipeline Corp., and Colorado Interstate Gas Co. It's expected to be certificated soon by the Federal Power Commission. But deliveries of pipe and other materials scheduled for early 1958 have been deferred. The reason: "problems created by the Memphis case decision," the companies said in a joint statement. They're in no position to finance unless all customers consent to the rates they propose.

But the companies expressed determination "to keep this project on the track." If it's approved by FPC, they plan to "proceed with construction at the earliest possible date in the circumstances." Construction of about 1,000 miles of 30 and 36 in. pipe ine is planned, involving these expenditures:

. . . **Natural Gas Pipeline,** $76,199,000 for looping its main line between Beatrice, Neb., and Chicago.

. . . **Chicago District Pipeline** Co., sister company of Natural, $13,000,000 for Chicago area looping.

. . . **Colorado Interstate,** $86,934,000, for a new line from the Oklahoma Panhandle to Beatrice, where delivery of 460,000 M.c.f. daily will be made to Natural.

. . . **Pacific Northwest,** $5,577,750, to double its 117,700 M.c.f. daily deliveries to CIG.

Another big pipeline company with a $100-million in projects pending before FPC commented: "We could not finance them now in face of this decision." This same company predicted several hundred million dollars in construction would be delayed.

Besides the expansions already filed, the decision places in jeopardy some $300 million in rate increases sought to recover higher costs of operation and purchased gas.

Industry reaction . . . J. J. Hedrick, president of Peoples Gas Light & Coke Co., parent of Natural Gas Pipeline, described the Memphis decision as "the worst blow to the industry in 20 years of federal regulation."

A Brooklyn Union Gas Co. statement said: "The whole natural-gas industry . . . will be adversely affected."

Similar comments came from transmission companies and producers as well. Some with little at stake in rate cases took the view that it is just another in a series of regulatory problems and will be worked out.

Effect of the decision will vary among companies. Houston Texas Gas & Oil Corp. is sheltered, for example, in two ways.

Most of its business is in direct sales from producer to utility, not subject to FPC price regulation. And, its resale business is covered by contracts which have written-in consent of customers to pass on higher costs due to taxes and higher gas prices, the main sources of rate hikes.

What next? . . . The immediate hope is that the Supreme Court will hear the appeal of the FPC, which has asked the solicitor general to petition the court.

Historically the court reviews only 10 per cent of the applications of the type to be filed in this case. It generally takes up about 30 per cent of those filed by the solicitor general, however. FPC hopes the solicitor general will win a review of the Circuit Court case in which the court sided with the city of Memphis and Mississippi Valley Gas Co. against United Gas Pipe Line Co.

New Mexico May Alter Policy

. . . on prorationing when pipeline to Texas is completed in 1958. Competition may force change in allowable plan.

NEW MEXICO'S Oil Conservation Commission "will have to take another look" at its split prorationing policy when the Texas-New Mexico pipeline goes into operation next spring and links the state's two producing areas.

The commission probably will adopt a uniform allowable for the entire state when the 512-mile line of Texas-New Mexico Pipe Line Co. begins taking crude from the Four Corners area in competition with southeastern New Mexico crude (OGJ, Dec. 9, p. 66).

This is a belief of A. L. (Pete) Porter, secretary and "professional" member of the three-man commission.

"The way we have felt about it all along is that as long as the southeastern New Mexico fields and the northwestern New Mexico fields sell to entirely separate markets there is no need for a state-wide allowable," Porter said.

"But if the pipeline takes northwestern oil to the southeast, then it will compete with oil in that area. It will all become one marketing area, and we'll have to take another look at our prorationing policy. It is quite possible we will have to establish a state-wide allowable."

Porter says there has been speculation among southeastern operators about what will happen but the commission has been under no pressure from them so far.

The commission in November set a separate allowable for northwestern crude which is now moving west in the new Four Corners pipeline. Basis for the allowable is different from the southeast.

The allowable fixed production at 28 bbl. per day, but last week the commission cut it back to 11 bbl. per day for January because most of the crude currently being taken from Four Corners is used only to fill the Four Corners pipeline. The market will improve when the pipeline starts operating in February.

Land Commissioner Murray Morgan, a commission member, said he wants to get "the facts" before committing himself on a single allowable for New Mexico.

Little Inch Makes Final Hurdle

. . . as barge operators withdraw objections. Value of line set at $110 million. Company drops plans for new laterals.

CONVERSION of the "Little Inch" pipeline from gas to products finally had a clear road last week after two tests in the courts and three reviews before the Federal Power Commission.

Mississippi River barge operators, who had been fighting the switch planned by Texas Eastern Transmission Corp., withdrew their objections as the FPC opened its third hearing on the project.

Acceptance of Texas Eastern's plan was based on assurances from the company and the FPC on points which had aroused opposition, the commission was told by Harold Leventhal, counsel for the barge interests.

The assurances on these points, Leventhal said, have quieted the bargers' fears thta Texas Eastern would:

. . . **Include costs or losses** in products transportation in its natural-gas accounts. This objection has been met by a condition imposed by the FPC that the gas and oil operations must be kept entirely separate.

. . . **Build new laterals** from the pipeline to important river ports. The company has dropped plans for such additions for the present at least.

. . . **Place a low value** on the pipeline, permitting it to charge rates lower than would be required for an independent operation. The company has advised the barge companies that it valued the line, including recent additions, at $110 million.

Rates based on such a value would approximate those which would be charged by an independent company, Leventhal said.

Leventhal urged, however, that conditions be written into the FPC's approval to make certain that these assurances would be carried out.

Texas Eastern, Leventhal said, should be required to operate the line as a common carrier at reasonable and nondiscriminatory rates, pending Interstate Commerce Commission valuation, on the basis of the $110-million value. And it should be barred for at least 5 years from installing new laterals on the line west of Moundsville, W. Va., except after ICC approval.

These conditions would bridge the gap in regulation after the FPC lets the line go and before the ICC takes hold, Leventhal pointed out.

Conversion of the "Little Inch" line to products service has been tied up in the courts for 2 years.

Bethlehem Supply Gets New President

C. R. ZIMMERMAN, executive vice president of Bethlehem Supply Co. since 1948, will take over January 1 as president of the company at Tulsa. He replaces G. A. Tompson, who is retired.

Zimmerman was employed in 1927 by Bethlehem Steel Co., the parent company, and advanced to special representative in the Sparrows Point pipe mills before transferring in 1938 to Bethlehem's general offices as a pipe division salesman.

In 1947 he became assistant to the vice president of Bethlehem Steel and was responsible for coordinating sales work between the supply and steel divisions. He moved to Tulsa and, in 1948, became executive vice president of Bethlehem Supply.

Tompson has been a Bethlehem official since 1937, when the company acquired Taubman Supply Co. Tompson had been a Taubman vice president. He served as vice president in charge of Bethlehem Supply's sales and operations from 1937 to 1948, when he was elected president. He will live in retirement at Carmel, Calif.

C. R. ZIMMERMAN
. . . moving up at Bethlehem.

—*Processing* briefs

Charles Baker, general manager of Pacific Cooperatives, Walla Walla, Wash., says the cooperative may build a refinery in Vancouver, Wash. A decision to build the plant will be made after economic studies are completed in mid-February. Baker said the plant will probably be a 15,000-bbl. operation.

Preliminary plans include a cat cracker, coking unit, alkylation unit, and possibly a cat reformer.

Baker said the refinery would probably use Canadian crude, but said "we'll get it where ever we can get it the cheapest."

Employes of the D-X Sunray Oil Co. refinery at West Tulsa have rejected union representation by a narrow vote. In an election conducted by the National Labor Relations Board, the vote was 538 for no union representation, 501 for the Oil, Chemical & Atomic Workers International Union, and 24 for the International Union of Operating Engineers.

Imperial Oil, Ltd. is spending $2,250,000 to expand its Vancouver, B. C., refinery. Crude capacity will be increased from 7,200 bbl. per day to 32,100 bbl. per day by adding an atmospheric furnace.

The project also includes a depropanizer, a stove-oil treater, drying facilities for middle distillates, and two 96,000-bbl. storage tanks. Auxiliaries will include new steam, electrical, and water capacity. Canadian Bechtel will handle most of the construction.

Completion of a 3,500-bbl. catalytic reforming unit at Continental Oil Co.'s Wichita Falls, Tex. refinery was announced last week. The new unit is part of a $1,500,000 modernization project.

Standard Oil Co. of California is going ahead with plans to build its 35,000-bbl. Hawaiian refinery at Barbers Point on Oahu Island despite the Interior Department's recent transfer of Sand Island to territory ownership making it available for leasing. Standard had originally tried to get a Sand Island site but gave up after lengthy delays and picked instead the Barbers Point site (OGJ, Sept. 23, p. 89).

Shell Oil Co. has let contract to Tellepsen Construction Co. to build a new control laboratory at the Norco, La., refinery. The single-story building will be needed when Platforming unit is completed later next year.

Date: December 24. Place: Carter Refinery. Food: Turkey

IT'S 10 minutes to midnight, Christmas Eve.

And these men are eating a turkey dinner in the crude unit at the Billings, Mont., refinery of Carter Oil Co.

Carter this year served a full Christmas meal to 191 refinery employes who had to work the day before Christmas.

In the tool sheds, the workshops, the crude units, and other spots in the plant, the men ate during their regular work shifts—one shift at 11:30 a.m., another at 5:15 p.m., and the third a few minutes before the Christmas bells rang out. On Christmas Day another 14 men on duty ate similar dinners. Holiday work is dictated by necessity at refineries, where operations continue around the clock, 7 days a week.

Food for the Christmas meals was prepared 5 mi'es from the refinery and kept hot with special equipment. In other years the company served sandwiches and cold cuts because of distance to a cafe.

Shown in the photo are five crude-unit workmen, left to right, M. N. Korwald, C. L. Seeley, E. L. Rademacher, E. L. McCormick, Jr., and V. E. McKinney.

Industry briefs

A third crude price has been posted in the Tri-State area. Ohio Oil Co. cut its posting by 10 cents per barrel for Illinois-Indiana crude. Several companies, led by Sohio Petroleum Co., reduced prices by 15 cents recently, while other companies have stood firm at the old price of $3.15 (OGJ, Dec. 23, p. 27).

Louisiana's allowable for January has been set at 799,657 bbl. daily. The total is 7,507 bbl. a day higher than the December allowable. The increase will take care of new production.

January allowables by districts are: Houma 203,529; Lafayette 154,496; Lake Charles 66,905; New Orleans 249,794; Monroe 59,744; Shreveport 65,189.

Brown & Thorp Oil Co., McCamey, Tex. and King Oil, Inc., Wichita Falls, have agreed to pay a reported $4,000,000 or more for the panhandle oil properties of John Turner, Borger, Tex., independent.

The Turner properties include about 3,000 acres of producing leases in Hutchinson County, with 126 wells producing 2,000 bbl. of oil a day.

Shareholders of Merrill Petroleums, Ltd., have agreed to merge with Pacific Petroleums, Ltd. By a majority of 98.5 per cent, the shareholders at Calgary approved an exchange of Merrill shares for Pacific shares on a two-for-one basis. The Alberta Supreme Court must sanction the merger and certain technical requirements must be met before the shares are exchanged.

Sinclair Crude Oil Co. has cut its crude price posting by 10 cents per barrel for Southwest Texas and the lower Gulf Coast. The new price meets a recent posting of Southern Minerals Corp. Prices in the area rose 40 cents last January, when there was a general increase of 25 cents for the industry. Since then Sinclair cut prices by 5 cents and now another 10 cents in the area.

Stockholders have approved the merger of Tidelands Oil Corp. into Commonwealth Oil Co., G. Burton Liese, president of the surviving company, announced. The merger becomes effective next month.

The Canadian and Catholic Confederation of Labor reportedly is attempting to block merger of the National Federation of Chemical Workers with the Oil, Chemical and Atomic Workers International Union. NFCW, composed of 4,500 workers in 13 unions in the Province of Quebec, voted at its recent convention in Montreal to align itself with OCAW District 16. Some of the loca's have been affiliated with CCCL.

Profit Formula to Stick

. . . at least for the present. Iraqi and Saudi officials say new profit-sharing deals will not affect old 50-50 setup.

INTERNATIONAL oil's 50-50 profit-split formula got some shoring up last week after a long period in which it appeared to be developing Middle East leaks.

One prop for the established formula came from an unexpected source —Shaikh Abdullah Tariki, Saudi Arabia's director general of oil.

The other was not quite as concrete as the statements made by Tariki, but it indicated that the government of Iraq will wait to see the color of more money before making any demands.

An official Iraqi government source said there will be no demand for Iraq Petroleum Co., Ltd., to revise its agreement "until the government is convinced that neighboring countries are receiving more profits than Iraq."

The first leak in the established formula came several months ago in Iran. The Italians offered Iran what has been widely interpreted as a 75-25 profit split on possible future profits, but with no concession bonus. Then, the Japanese made a deal with Saudi Arabia early this month which would give the Saudis 56 per cent of the profits right down to the retail outlet level, if and when oil is found.

The whole trend has been more than a little alarming to established Middle East producing companies. They split the profits right down the middle with the countries in which they operate and only on oil production.

Last week Tariki offered a few words of comfort, at least to Arabian American Oil Co.

The Saudi oil director said the Japanese oil agreement will have no effect on Aramco. He made the comment in spite of the fact that he has plugged, both publicly and privately, for a share in the profits from Arabian oil in both the refining and marketing fields. He has made it clear in the past that he would like to see Aramco change from an oil producer to a refiner and marketer, with his country sharing in the profits of the other two operations.

He said last week in Beirut that Saudi Arabia has "no idea of changing the Aramco concession" to get terms similar to those which the Japanese offered.

Japanese terms . . . At the same time, Tariki cleared up some of the more obscure points in the Japanese agreement that have been the source of only rumors up to now.

He said Kuwait may or may not make the same kind of a deal with the Japanese. It will make no difference to the Saudi agreement already signed. However, both Tariki and Taro Yamashita, president of the newly formed Japanese Arabian Oil Co. are now in Kuwait presumably to talk the situation over with Kuwait.

The Saudis have granted the Japanese the right to look for oil in an underwater area off the coast of the neutral-zone buffer between Saudi Arabia and Kuwait. Since the Neutral Zone is claimed by both countries, the oil concessions on land have been a joint operation in which both countries share with two American oil companies (OGJ, Dec. 16, p. 81).

It has been generally assumed that the Japanese would have to make an agreement with Kuwait before they could successfully carry out exploration in the offshore area. Tariki says no. The Japanese, however, are confidently hoping to make such a deal.

Tariki confirmed last week that the Saudi Government will get 56 per cent of any profits from the Japanese oil operation, if and when production is found. This has been only a widely circulated rumor up to now.

He emphasized that the division applies to the net profits of the Japanese company "both inside and outside Saudi Arabia." This would indicate that Tariki has succeeded in selling the Japanese his theory that the Saudis should share in both the refining and marketing profits from their oil production. The Japanese have also agreed to build a refinery in Saudi Arabia. No size for the plant has been mentioned.

The Saudi Government has the right to buy up 20 per cent of the Japanese company's original stock at its original price and the same percentage of any future stock issued. This, Tariki emphasized, is up to the discretion of his government and will come only after production is established.

Sahara Crude Moves to Coast

THE French dream of oil from the Sahara Desert should start coming true this week with the arrival of regular shipments of Hassi Messaoud crude at Philippeville, on the Mediterranean Coast of Algeria.

Plans initially are to move 4,000 bbl. daily through a temporary 440-mile pipeline and rail system. This will be a trickle compared with the expected flow when a 24-in. crude line to the Mediterranean is built later.

The present 100-mile, 6-in. line will take the crude north to a railhead at Touggourt. From there, tank cars will move shipments 340 miles to Philippeville.

Both the crash-built pipeline and a track-widening program were completed ahead of the year-end target date. The crude will be shipped by tanker to France for refining.

Edjele line . . . Another Sahara pipeline project from Edjele field in extreme eastern Algeria to the Mediterranean Coast is being planned by Cie. de Recherches et d'Exploitation de Petrole au Sahara (CREPS).

Recent reports from Tunis indicate the Tunisian Government apparently wants the proposed 16-in. crude line to pass through its territory. The government reportedly has agreed in principle to a route which would cross 300 miles of Tunisia, terminating at La Skirra.

The company, in which Royal Dutch-Shell has a 35 per cent interest, is negotiating with both the Tunisian and Libyan governments. CREPS hopes to be moving crude out of Edjele by March 1960. Pipe for the project is already on order.

A line from the field, which lies deep in the Sahara Desert near the Libyan border, could be laid either through Tunisia or Libya (OGJ, Nov. 11, p. 132).

Tunisia's president, Habid Bourguiba, would welcome the pipeline, but he said earlier this year he doesn't think the French will move Saharan oil until they settle with Algeria's nationalists. Tunisia has been actively sympathetic with Algerian nationalists.

Bourguiba has pointed out that the shortest route would be through Tunisia to the Tunisian coast rather than the Libyan coast.

1957 Was a Big Year in International Oil

THE INTERNATIONAL OIL INDUSTRY showed plenty of bounce in 1957.

The Suez Canal crisis dominated operations during the year's first half. The vital waterway was closed at the beginning of the year, putting a production strain on areas outside the Middle East. When the canal reopened in late spring, it prompted the inevitable readjustment.

But by the end of the year, dynamic growth tendencies had reasserted themselves.

The Middle East, with exception of Iraq, staged a spectacular comeback. It showed an over-all production gain of 4.7 per cent over 1956. Iraq, still plagued by damaged pipeline pumping stations in Syria, alone showed a net loss of more than 30 per cent.

Middle East oil reserves again chalked up a healthy gain of 15 per cent with extensions of existing fields and new discoveries accounting for most of the increase.

The biggest reserve increase, percentagewise, came in the Asia-Pacific area where Indonesian reserves were revised upward sharply. The area showed a more modest, but still healthy, gain of slightly more than 10 per cent in production. Again Indonesia, principally central Sumatra, accounted for the boost.

Reserves for the Europe-Africa oil region of the world jumped sharply in 1957 with Africa accounting for almost all the gain. Production from newly discovered oil reserves in Africa hasn't yet been felt, but Europe managed to boost its modest oil output almost 14 per cent in an effort to help meet its own oil needs. Africa's production will be felt in the coming year.

Latin-American reserves increased almost 17 per cent with Venezuela furnishing most of the upturn. Discoveries in newly opened areas of Lake Maracaibo, plus new developments to the west of the lake and in eastern Venezuela combined to make up the increase.

Venezuela production zoomed early in the year as companies produced more to supply European markets cut off from normal Middle East supplies. By midyear this production was cut back sharply, but Latin America still wound up the year with a 10 per cent increase in oil output.

World-wide refining's basic crude capacity increase of 9.8 per cent in 1957 is only a forecast of what is to come. Major construction projects all over the world will increase capacity another 14.5 per cent in 1958, and more in 1959.

Trinidad Eyes Oil for Money

THE HIGH PRICES paid for new Venezuelan concessions, especially in the Gulf of Paria, did not go unnoticed in neighboring Trinidad.

The Trinidad government's eyes bulged when it saw Venezuela this year take in $112 million for 219,000 acres leased in the Gulf of Paria. Trinidad granted licenses in the gulf years ago at prices that now look to the government like a song.

Prices paid by American companies have an added glitter this year because the Trinidad Government is looking for additional revenue. The United Kingdom has turned down a $300 million loan request.

Last week the island government still was puzzling over a 1958 budget after a month delay. The tie-up hinged on the question of whether to pry more money from companies with offshore rights and, if so, how much.

The oil industry now contributes about one-third of the island's revenue. But the $750 million collected over the years by Trinidad from oil operations suddenly looks smaller in the face of $668 million collected by Venezuela in the past 2 years for concessions alone.

Trinidad officials this month have talked in Caracas with the Venezuela Ministry of Mines and Hydrocarbons and have held discussions in Trinidad with local oil men.

It's a good bet that companies dusted off the arguments used 2 years ago when they pressed for tax concessions for offshore operations. The island's ratio of production to reserves is poor. The Gulf of Paria at that time was not widely known as a hot spot. And there still are some skeptics.

Soldado field, the one field discovered so far in the gulf, lies on the Trinidad side of the boundary, 6 miles from Cedros Point off the southeast corner of the island. Trinidad Northern Areas has drilled several directional wells from the first Soldado barge, and a second barge is under construction. TNA is owned by British Petroleum Co. Ltd., Royal Dutch-Shell, and The Texas Co.

A Standard Oil Co. of California subsidiary, Dominion Oil, Ltd., is below 1,000 ft. in a floating barge test 32 miles northeast of Soldado.

Paria Operations, Inc., is drilling its first well on the Venezuelan side of the gulf. The company is the operator for a four-company group, Continental Oil Co., Texaco, Cities Service Oil Co., and Richfield Oil Corp.

Contract Awarded for Big Iran Project

IRANIAN OIL PARTICIPANTS, Ltd., has awarded a $56-million contract for a pipeline and tanker terminal that will open Gach Saran field to major production.

The operating company for the consortium group approved a joint offer by five companies from three countries. They are Raymond Concrete Pile Co. and Williams Brothers Co. of Tulsa, both U. S. firms; Richard Costain, Ltd., and John Brown, Ltd., of Britain; and Werkspoor & Bredero, of The Netherlands.

A new terminal will be built at Kharg Island in the Persian Gulf. It will include a 30-in. loading line laid out to a depth of 150 ft., enabling the biggest tankers to take on crude. A 50-mile, 26-in. and 28-in. pipeline will connect the terminal with Gach Saran.

The pipeline and terminal are part of a $150-million expansion program the consortium has planned for 1958. Other projects include looping for the system moving Agha Jari crude to Bandar Mashur, stepped-up exploration and drilling, and a major housing and welfare program for Iranian workers (OGJ, Nov. 4, p. 102).

Gach Saran, one of the world's largest fields, was discovered 30 years ago. It is Iran's southernmost production. Until the growing market for heavy fuel oil made the 31.8°-gravity sour crude desirable, there was little demand for the oil.

World-wide Oil Report

An Annual Report by The Oil and Gas Journal

STATISTICAL AND HIGHLIGHT MATERIAL BY PAUL SWAIN AND RAY GIBSON, STAFFERS

STATISTICS • MAPS • HIGHLIGHTS • FEATURE ARTICLES • DIRECTORY

(BELOW) SUMMARY OF JOURNAL SURVEY

COUNTRY	RESERVES	WELLS		PRODUCTION			REFINING		
	Proved bbl. (1,000's)	Total producing 7-1-57	Drlg. 12-1-57	1,000 bbl. per day for 1957	Per cent differ. 1956	Cum. bbl. in 1,000's to 7-1-57	No. oper. refrs.	Cap., 1,000 B/D — Crude distillation	Cracking
Europe and Africa:									
Algeria	500,000	0	24	0.2	—66.6	2,395	0	0	0
Austria	350,000	3,000	32	60.0	—9.9	.....	9	46.9	11.0
Belgium	0	0	0	0	0	0	7	162.9	25.3
Denmark	0	0	1	0	0	0	3	0.6	0
East Africa	0	0	5	0	0	0	0	0	0
Egypt	275,000	179	6	42.5	30.8	218,263	2	75.0	9.2
Finland	0	0	0	0	0	0	1	18.0	6.0
France	150,000	433	34	27.8	33.7	52,145	13	633.6	156.3
West Germany	450,000	3,032	81	76.2	11.7	217,644	25	357.2	80.5
Greece	0	0	0	0	0	0	1	30.0	0
Italy (incl. Sicily)	200,000	450	43	24.3	129.0	12,935	36	580.5	77.0
Libya	0	0	2	0	0	0	0	0	0
Morocco	9,000	96	2	1.5	—25.0	5,667	1	2.3	1.8
Netherlands	115,000	306	3	26.5	27.4	56,453	2	349.0	95.0
Norway	0	0	0	0	0	0	1	1.8	0
Portugal	0	0	1	0	0	0	1	22.9	10.6
South Africa	0	0	0	0	0	0	1	21.1	9.7
Spain	0	0	3	0	0	0	3	132.7	3.5
Sweden	0	0	0	0	0	0	4	47.5	1.0
Tunisia	0	0	1	0	0	0	0	0	0
Turkey	65,000	20	10	6.1	8.9	4,382	1	6.9	3.0
United Kingdom	7,000	229	5	1.6	23.1	7,555	13	519.3	104.3
West Africa	30,000	19	19	0.3	...	100	0	0	0
Yugoslavia	32,000	900	16	8.1	5.7	.....	...	.....	.....
Tota	2,183,000	8,664	288	275.1	....	577,529	124	3,008.2	594.2
Middle East:									
Aden	0	0	0	0	0	0	1	120.0	0
Bahrain	200,000	142	2	32.0	6.7	192,324	1	211.0	43.3
Iran	32,000,000	88	8	725.0	36.6	3,803,111	3	538.3	30.0
Iraq	25,000,000	75	11	440.0	—30.6	1,686,254	6	55.8	10.0
Israel	50,000	14	9	1.2	100.0	345	1	85.0	0
Jordan	0	0	1	0	0	0	0	0	0
Kuwait	60,000,000	230	5	1,110.0	2.1	2,330,758	1	30.0	0
Lebanon	0	0	1	0	0	0	2	24.0	0
Neutral Zone	5,000,000	58	5	65.0	103.4	34,912	0	0	0
Qatar	1,750,000	36	1	136.0	2.2	236,181	1	0.6	0
Saudi Arabia	45,000,000	187	4	990.0	0.4	2,829,535	1	189.0	0
Southern Arabia	500,000	0	3	0	0	0	0	0	0
Syria	1,000	0	1	0	0	0	0	0	0
Total	169,501,000	830	51	3,499.2	....	11,113,420	17	1,253.7	83.3

(Table continued on next page)

(Continued from previous page)

COUNTRY	RESERVES	WELLS		PRODUCTION			REFINING		
	Proved bbl. (1,000's)	Total producing 7-1-57	Drlg. 12-1-57	1,000 bbl. per day for 1957	Per cent differ. 1956	Cum. bbl. in 1,000's to 7-1-57	No. oper. refrs.	Cap., 1,000 B/D Crude distillation	Cracking
Western Hemisphere:									
Alaska	1,000	0	4	0	0	0	0	0	0
Argentina	750,000	3,400	63	91.1	7.3	642,346	15	197.3	63.4
Bolivia	70,000	80	12	9.8	14.0	16,662	4	11.7	0
Brazil	140,000	151	27	27.4	147.0	12,975	10	113.8	72.3
Canada	4,000,000	11,600	177	494.8	5.3	926,703	43	795.0	341.0
Chile	40,000	50	5	11.8	21.6	11,274	1	20.0	9.4
Colombia	650,000	1,976	37	124.6	4.2	786,058	5	70.7	60.7
Cuba	3,500	65	6	1.1	—26.7	4,489	5	84.2	24.6
Ecuador	25,000	1,683	9	8.0	—14.9	70,285	2	5.6	0
Mexico	2,750,000	1,895	120	241.0	—3.0	3,079,413	8	444.0	55.3
Netherlands, W.I.	0	0	0	0	0	0	2	650.0	536.0
Peru	275,000	3,243	13	52.0	3.6	502,222	3	49.2	15.2
Puerto Rico	0	0	0	0	0	0	2	72.3	66.7
Trinidad	300,000	3,033	29	93.2	15.4	567,000	3	141.0	55.0
United States	33,000,000	559,000	2,393	7,160.0	0.1	56,586,738	317	9,570.0	3,988.5
Uruguay	0	0	0	0	0	0	1	28.0	2.0
Venezuela	16,000,000	11,272	159	2,790.0	13.6	10,034,901	12	755.8	157.1
Total	58,004,500	597,448	3,054	11,104.8	..	73,241,066	433	13,008.6	5,447.2
Asia-Pacific:									
Australia	1,000	0	3	0	0	0	7	207.4	57.5
Burma	45,000	199	3	6.5	30.0	298,600	2	6.5	0
British Borneo	550,000	478	3	117.8	0	461,000	1	50.0	0
Formosa	0	0	1	0	0	0	1	28.0	14.0
India	400,000	576	6	9.2	16.5	1,721,013	4	98.7	31.2
Indonesia	7,500,000	2,014	15	310.0	21.5	59,400	5	243.8	44.5
Japan	25,000	3,695	15	6.1	0	99,302	22	430.1	49.5
New Guinea	35,000	44	2	6.3	—12.5	20,173	0	0	0
Pakistan	22,000	600	8	5.8	0	8,453	1	6.0	0
Philippines	0	0	2	0	0	0	1	18.0	7.5
Total	8,578,000	7,606	58	461.7	..	2,667,941	44	1,088.5	204.2
Total free world	238,266,500	614,548	3,451	15,340.8	..	87,599,956	618	18,359.0	6,328.9
Russia and controlled areas	*26,200,000	..	..	2,190.0	12.4	..	..	..	..
Total world	264,466,500	614,548	3,451	17,530.8	..	87,599,956	618	18,359.0	6,328.9

*Includes (thousands of barrels) USSR 24,500,000, Romania 700,000, Hungary 145,000, Albania 20,000, China 800,000, Czechoslovakia 15,000, and Poland 20,000.

NEXT . . . Country-by-country maps and refining and production data

Abbreviations used in tabulations . . .

Cracking Processes:
FCC—Fluid cat cracking
TCC—Thermofor cat cracking
HD—Houdriflow cat cracking
TC—Thermal cracking
Vis—Visbreaking
Plf—Polyforming

Other Processing:
A—Asphalt
Alky—Alkylation
BPA—BP Autofining
BPH—BP Hydrofining
Cat—Atlantic Catforming
CH—Catalytic hydrodesulfurization
CR—Cat reforming
Cy—Perco Cycloversion
Fhy—Fluid Hydroforming
H—Hydrogenation
HF—Houdriforming
Hyd—Esso Hydrofining
Is—Butane isomerization
L—Lube manufacture
PD—Perco desulfurization
Pf—UOP Platforming
Poly—Polymerization
Pwr.—Esso Powerforming
S—Sulfur recovery
Sf—Sovaforming
TR—Thermal reforming
Un—UOP Unifining
V—Vacuum distillation

. . . and index to countries covered in report

	Page
Central and South America	**123**
Venezuela	124
Bolivia	126
Ecuador	126
Columbia	127
Caribbean Area	127-128
Argentina	128
Peru	129
Trinidad	129
Chile	130
Mexico	130
Brazil	131
Uruguay	131
Europe	**132**
United Kingdom	133
Portugal	134
France	134
Netherlands	135
Scandinavia	135
Denmark	135
Italy	136
Spain	137
Austria	137
Belgium	137
W. Germany	138-139
Africa	**140**
Morocco	140
Algeria	140
F. Eq. Africa	140
South Africa	140
West Africa	140
Middle and Far East	**141**
Bahrain	142
Egypt	142
Israel	142
Iran	143
Qatar	143
Neutral Zone	143
Iraq	144
Kuwait	144
Aden	144
Saudi Arabia	145
Turkey	145
Lebanon	145
Pakistan	146
India	146
Australia	146
Indonesia	147
Burma	148
Netherlands New Guinea	148
Formosa	148
Philippines	148
Sumatra	149
Japan	150

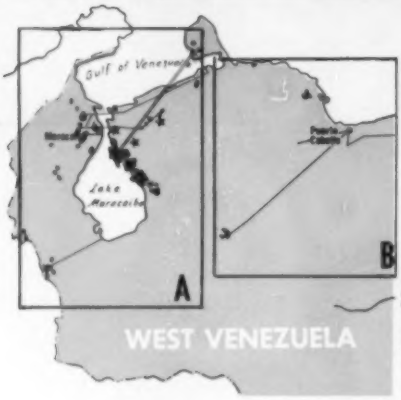
Central and South America

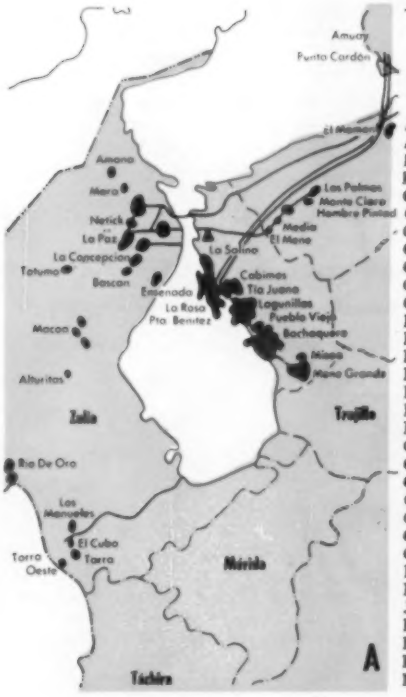
Production and Refining Capacity

BARRELS PER DAY

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
ARGENTINA	89,700	197,300
BOLIVIA	9,600	11,710
BRAZIL	23,200	113,800
CHILE	7,400	20,000
COLOMBIA	126,400	70,700
CUBA	1,100	84,200
ECUADOR	8,600	5,625
MEXICO	240,100	444,000
NETH. W. INDIES		650,000
PERU	52,800	49,200
PUERTO RICO		72,300
TRINIDAD	90,400	141,000
URUGUAY		28,000
VENEZUELA	2,899,100	755,800

VENEZUELA





WESTERN VENEZUELA PRODUCTION

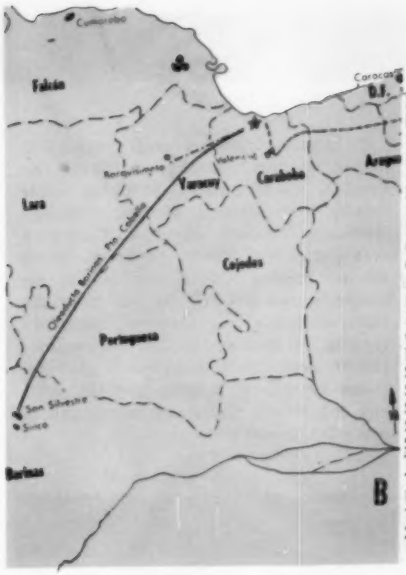
Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
State of Barinas							
Barinas, 1953	....	8,579-9,046	30	....	487	379,392	25.4
Sylvestre, 1945	....	8,858	12	....	397	347,957	24.3
Total Barinas			42	....	884	727,349	
State of Trujillo							
Motatan, 1938	....	8,850	4	....	2,938	2,713,687	20.5
Total Trujillo			4	....	2,938	2,713,687	
State of Falcon							
Cumarebo, 1913	....	1,968	21	6	2,555	51,979,666	48.0
Mamon, 1926	....	3,350	2	....	248	531,653	35.1
Mene Mauros, 1921	....	600-1,850	2	53	2,218	28,404,616	37.8
Hombre Pintado, 1927	....	1,000	....	28	373	5,901,079	25.5
Tiguaje, 1953	....	3,328-3,348	14	1	2,170	1,525,011	27.5
Total Falcon			39	88	7,564	88,342,025	
State of Zulia							
Bachaquero, 1930	....	3,444	283	1,358	479,380	745,665,029	13.1
Boscan, 1946	....	6,500-7,500	1	*251	93,337	94,586,351	10.4-12.8
Cabimas, 1917	....	2,200	127	760	73,245	816,734,276	19.6-25.8
Ceuta, 1956	....	....	2	....	658	119,154	35.4
Concesiones Lacustres, 1947	....	7,000	150	....	308,956	123,968,061	30.8
Curazaito, 1957	....	....	1	....	47	8,554	19.8
El Cuba, 1916	....	984	38	*107	22,543	160,520,659	35.2
Ensenada, 1948	....	8,550	1	....	84	502,643	56.4
La Concepcion, 1935	....	3,148-8,000	30	76	17,411	60,566,880	36.0
Lagunillas, 1926	....	900-5,100	357	*1,625	653,468	2,937,511,861	13.5-20.3
La Paz, 1925	....	4,264-8,000	23	*63	115,031	498,455,456	33.0
Mara, 1945	....	5,248	35	*29	64,452	259,539,859	19.8-30.0
Mene Grande, 1914	....	4,132	3	*475	36,869	460,425,555	17.9
Pueblo Viejo, 1940	....	1,968	21	32	8,617	21,964,786	13.7
Sibucara, 1948	....	13,451	5	....	8,024	24,631,018	37.7
Tia Juana, 1928	....	3,000	218	1,186	257,466	1,146,117,314	13.4-26.1
Urdaneta	....	....	....	3	988	178,700	12.0
Total Zulia			1,295	5,965	2,140,576	7,351,496,156	
Total West. Venezuela			1,380	6,053	2,151,962	7,443,279,217	

*Includes shut-in wells.

EASTERN VENEZUELA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
State of Anzoategui							
Apamate, 1951	....	6,670	1	....	60	30,963	43.1
Araibel, 1954	....	10,516	15	*5	6,440	6,706,494	35.7
Boca, 1951	....	9,500	20	*5	10,628	25,926,192	34.1
Bruzual, 1954	....	2,900	....	....	....	70,000	41.1
Cachama, 1952	....	7,724	2	....	292	417,320	34.2
Caico Seco, 1946	....	6,500-7,300	12	*16	5,917	13,381,505	36.5-42.1
Cascaroncito, 1953	....	8,968	....	....	....	21,068	44.0
Cerro Pelado, 1951	....	4,400	†2	....	5	108,102	38.2
Chaparrito, 1957	....	....	†1	....	73	13,209	32.9
Chimire, 1948	....	7,000-7,200	100	*20	48,002	127,031,058	35.6
Chive, 1957	....	....	12	....	10,688	1,934,629	31.2
Dacion, 1951	....	6,700	61	*32	28,335	58,549,750	21.6-22.2
Elias, 1957	....	....	4	....	130	23,574	36.1
El Roble, 1939	....	3,500-11,560	13	*10	3,370	28,702,492	45.3-47.8
Esquina, 1951	....	4,360	1	....	202	768,426	41.7
El Toco, 1948	....	9,000	15	*2	4,023	11,210,207	36.4
Flecha, 1953	....	5,736	2	*2	957	727,146	39.0
Fria, 1948	....	6,500-7,300	6	*11	2,281	6,523,479	35.2
Galan, 1957	....	....	†1	....	6	1,076	34.2
Guara, 1942	....	5,000-10,000	102	*127	50,401	276,264,781	30.0-36.8
Guara-500	....	....	7	16	3,212	1,747,274	18.5
Guario, 1940	....	5,000-10,000	17	*6	7,273	29,017,771	44.6
Guavinita, 1948	....	3,500	....	....	....	....	....
Guere, 1951	....	7,800	14	*15	4,525	17,427,249	37.4
Guico, 1944	....	4,500-7,000	21	*31	4,944	48,218,388	33.1
Inca, 1948	....	7,100	†6	†1	39	622,571	39.1
Isla, 1954	....	5,470	2	....	218	451,083	43.6
Junta, 1954	....	6,720	12	*3	3,559	3,045,281	25.8
La Ceibita, 1953	....	9,871-9,878	9	....	3,500	2,299,450	33.4
La Vieja, 1951	....	2,570	2	*11	761	2,112,229	24.0
Las Adjuntas, 1954	....	7,000-7,200	11	....	2,713	559,472	25.9
La Freitera, 1957	....	....	†1	....	165	29,807	42.8

EASTERN VENEZUELA PRODUCTION



Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	No. of wells— Pumping	Production in bbl.— Daily	Production in bbl.— Cumulative	Gravity °A.P.I.
State of Anzoategui							
Leona, 1938		8,000	37	*18	20,406	38,538,560	28.9
Lobo, 1952		6,400	2	*6	772	1,724,945	26.8
Los Mangos, 1950		7,743	1	....	125	267,177	39.8
Luna, 1957		....	....	5	183	33,160	13.0
Mapiri Este, 1949		9,500	9	....	2,067	12,104,962	35.5
Mata, 1951		11,520	74	....	34,441	29,844,986	31.3-346.
Merey, 1937		5,700	3	40	4,914	7,023,648	15.1-17.7
Nipa, 1945		6,000-8,500	195	*44	77,140	131,994,998	33.9-34.6
Oficina, 1937		5,900	110	*218	65,272	319,435,759	27.7
Oscurote, 1953		9,513	49	1	28,164	17,777,424	32.2
Palacio, 1946		3,440	33	38	....	....	....
Pelayo		....	2	....	181	648,721	29.2
Pradera, 1951		6,430	4	2	1,633	1,583,724	28.4
Quiamare, 1942		5,900-6,650	15	*5	2,969	7,342,077	42.4
Rincon Largo, 1941		6,500-8,500	....	....	....	6,700,000	36.2
San Joaquin, 1939		6,560	37	*8	8,071	20,055,336	44.9
San Roque, 1949		8,500	22	*5	1,772	13,501,791	51.9
Santa Ana, 1936		8,500	43	*5	20,422	31,949,574	39.3
Santa Rosa, 1941		8,500	75	*7	41,918	48,562,426	44.9
Soto, 1949		9,500	77	*29	34,518	67,201,186	34.9
Tacata, 1946		2,210	1	....	163	386,827	38.4
Tapuco, 1952		10,000-10,170	14	*10	6,485	10,148,188	33.3
Unare, 1957		....	....	....	47	8,554	44.9
Yopales, 1937		4,600	20	*33	8,136	14,000,458	21.4
Zeta, 1954		10,700	73	*13	36,495	33,054,918	30.5
Total Anzoategui			1,368	800	599,013	1,477,631,445	

*Includes gas-airlift wells. †Shut in.

Federal Territory of Amacuro							
Pedernales, 1933		1,571	23	....	11,970	42,029,629	21.1
Tucupita, 1945		5,606	41	....	5,841	28,297,102	16.6
Total Amacuro			64	....	17,875	70,326,731	
State of Guarico							
Aragua, 1950		7,519-8,822	12	*3	1,306	2,258,528	52.6
Belen, 1954		4,648	†1	....	8	5,504	50.0
Bella Vista, 1952		2,962-4,637	20	*34	3,546	4,432,909	25.2
Dakoa, 1951		3,500-5,700	2	....	193	327,485	34.7
Grico, 1946		400-4,870	....	....	....	130,000	28.8
Las Mercedes, 1942		4,160-4,500	112	*56	23,262	70,939,075	31.8
Piraqua, 1949		3,448	....	....	....	....	36.8
Punzon, 1946		4,400	2	....	408	479,433	34.8
Ruiz, 1949		4,450	21	*33	5,351	20,039,434	31.9
Saban, 1947		2,600	22	*29	4,337	11,093,639	38.3
Taman, 1949		5,200	1	15	1,676	10,870,455	38.6
Tucupido, 1947		2,800-5,600	8	*14	1,767	14,300,059	40.3
Valle		....	3	....	449	163,076	36.8
Total Guarico			204	184	42,303	117,039,597	

*Includes gas-airlift wells. †Shut in.

State of Monagas							
Aguasay, 1955			3	*1	1,946	491,036	36.3
Cachipa			....	....	93	16,926	33.9
Coporo, 1954		5,746	†2	....	....	....	35.1
Jobo		....	†7	....	65	11,686	9.5
Jusepin, 1938		3,000-5,300	92	*83	11,424	162,766,001	32.3
Manresa, 1954		2,524-2,615	1	3	880	498,087	16.3
Mata Grande, 1946		4,700	5	*33	1,989	6,043,962	26.8
Mulata, 1941		3,500-6,600	35	*88	6,402	83,049,714	37.2
Muri, 1942		4,500	2	*22	520	15,711,138	26.4
Oritupano, 1954		7,675	9	....	3,404	1,495,658	23.6
Orocual, 1933		2,954	10	1	4,504	1,985,312	22.2
Pilon		....	†32	....	1,141	205,721	14.2-16.2
Quiriquire, 1928		6,500-8,000	....	507	63,396	493,155,279	16.2
Santa Barbara, 1941		5,000-6,500	94	*107	24,946	103,626,377	33.7-34.7
Tacat, 1953		1,830-3,668	....	37	3,498	2,033,464	19.2
Temblador, 1936		3,500-4,500	57	*16	8,832	54,150,072	21.7-26.2
Travieso, 1944		4,000	....	9	147	1,388,742	26.0
Uracoa		....	†4	....	20	3,604	15.3
Total Monagas			353	907	133,207	926,632,779	

*Includes gas-airlift wells. †Shut in.

Total East. Venezuela	1,989	1,891	792,398	2,591,630,552	
Total Venezuela	3,369	7,944	2,944,360	10,034,909,769	

VENEZUELA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Cia. Shell de Venezuela, Ltd.:			
Cardon	[1]170,000	25,000 TC 33,000 FCC	1,500 Alky, 2,000 Poly, 8,000 TR, 3,000 I., 19,000 V
San Lorenzo	45,000		
Colon Development Co., Ltd.:			
Calvario	1,000		
Casieua	300		
La Rivera	300		
Creole Petroleum Corp.:			
Amuay	[2]345,000		10,200 Fhy, 410 A, 17,000 Hyd, 87,-500 V
Caripito	[3]67,000	42,000 Vis	
Phillips Petroleum Co.—San Roque	[4]3,200		
Richmond Exploration Co.—Bajo Grande	20,000	10,000 TC	
Sinclair Oil & Refining Co.—Puerto La Cruz	35,000	12,000 Vis	
Texas Petroleum Co.—Tucupita	10,000		
Petroquimica—Moron[5]			
Venezuela Gulf Refining Co.—Puerto La Cruz	59,000	8,650 FCC 14,500 Vis 12,000 Plf	
Total	755,800	157,150	

(1) Includes: 25,000-bbl. crude processed in thermal cracker. Building: 80,000-bbl. atmospheric crude capacity, 35,000-bbl. crude flashing, and 60,000-bbl. vacuum; 45,000-bbl. visbreaking, 2,300-bbl. alkylation. Completion third quarter 1958. Current crude runs 186,000 bbl. (2) Building 820-bbl. lube capacity for completion mid-1958. (3) Includes 25,000-bbl. crude distillation and 42,000-bbl. crude visbreaking. (4) Building 3,500-bbl. crude capacity and 500 metric tons asphalt capacity. (5) Venezuelan Government building 3,000-bbl. crude unit and 350-bbl. Catforming unit as part of new petrochemical plant.

BOLIVIA

BOLIVIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	Pumping	Production in bbl.—Daily	Cumulative	Gravity °A.P.I.
Bermejo, 1922		3,600	7	5	572	1,614,700	26-27
Camiri-Guairuy, 1926-1946		4,400	46	6	8,390	12,725,000	54-59
Sanandita, 1926		3,100		13	107	2,037,600	41.0
Toro, 1955		4,100	3		561	284,209	21-54
Total			56	24	9,360	16,661,509	

BOLIVIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Yacimientos Petroliferos Fiscales Bolivianos:			
Camiri	1,450		
Cochabamba	5,850		200 L
Sanandita	410		
Sucre	4,000		
Total	11,710		

ECUADOR

ECUADOR PRODUCTION

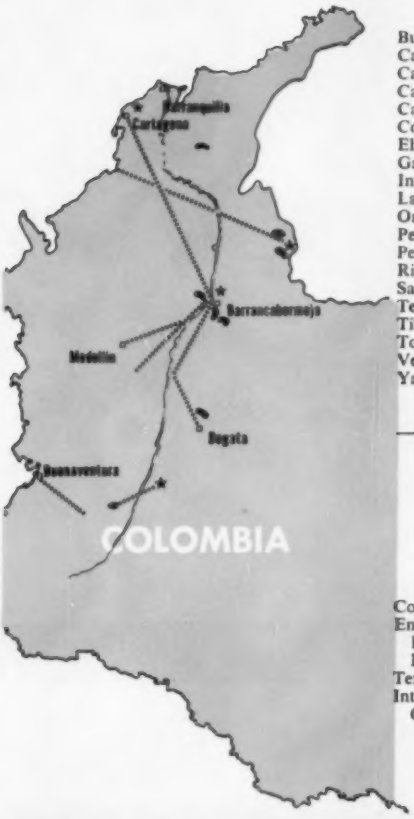
Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	Pumping	Production in bbl.—Daily	Cumulative	Gravity °A.P.I.
Ancon, 1921		400-5,000			6,922	56,051,977	37-38
Carolina Santa Paula, 1934		495			1,080	2,471,557	27-28
Cautivo-Tigre, 1920		500-3,500			1,590	9,013,610	37-38
Concepcion, 1931		4,000			157	1,384,861	
Petropolis-San Marcos, 1937					161	1,363,060	29-30
Total			103	1,580	9,910	70,285,065	

ECUADOR REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Anglo-Equadorian Oilfields, Ltd.:			
La Libertad[1]	5,000		
Santa Elena	625		
Total	5,625		

(1) Building new 7,700-bbl. crude unit and 6,000-bbl. thermal cracking unit.

COLOMBIA



COLOMBIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	No. of wells— Pumping	Production in bbl.— Daily	Production in bbl.— Cumulative	Gravity °A.P.I.
Buturama, 1953	....	6,567	3	....	85	163,769	36-38
Caipal, 1955	....	6,000	....	....	....	....	17.0
Cantagallo, 1943	....	4,525-7,358	7	4	2,563	5,639,862	20.6
Carbonera, 1939	....	800-1,999	....	....	56	292,052	20.7
Casabe, 1941	....	2,140-5,660	....	388	30,702	118,466,836	21.1
Colorado, 1925	....	2,800-5,600	6	9	430	1,139,322	30-40
El Dificil, 1943	....	5,590-5,800	15	....	1,275	6,700,261	46.1
Galan, 1945	....	3,000-4,000	16	24	2,950	3,164,589	19-20
Infantas, 1918	....	600-3,500	1	327	7,600	172,228,711	24-32
La Cira, 1925	....	900-4,200	1	750	18,350	325,523,587	24-30
Ortega, 1951	....	5,800	....	3	1,167	1,304,571	28
Petrolea (North), 1933	....	760-1,220	11	10	284	32,115,232	45
Petrolea (South), 1937	....	1,000	....	....	....	42,178	37.0
Rio de Oro, 1937	....	1,200-7,900	11	12	3,431	3,622,533	46.6
Sardinata, 1941	....	4,460-9,700	8	12	1,951	2,985,484	36-48.7
Tetuan, 1949	....	2,600	1	....	110	231,907	33
Tibu	....	4,500-9,700	48	195	19,246	86,988,265	22-46
Totumal, 1951	....	8,872	2	....	288	250,971	25.8-26.3
Velasquez	....	7,000	58	49	27,386	22,371,673	16-28
Yariquí, 1954	....	7,190-8,028	5	....	8,374	2,826,117	20.4
Total			193	*1,783	126,248	786,057,920	

*Includes artificial-lift wells.

COLOMBIA REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Bbl. per stream day— Cracking	Other processing—
Colombian Pet. Co.—Tibu	2,000	.....	.....
Empresa Colombiana de Petroleos:			
Barrancabermeja	36,500	19,280 FCC	1,400 A, 450 L
La Dorada	4,500	16,500 Vis	1,255 Alky
Texas Petroleum Co.—Guamo	1,200	.....	.....
International Petroleum (Colombia), Ltd.—			
Cartagena	26,500	25,000 FCC	1,200 Poly
Total	70,700	60,780	

CARIBBEAN AREA

CUBA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	No. of wells— Pumping	Production in bbl.— Daily	Production in bbl.— Cumulative	Gravity °A.P.I.
Bacuranao-Cruz Verde, 1916-1956	....	1,100	....	18	121	134,500	28
Catalina, 1956	....	6,890	....	1	34	5,430	32
Guanabo, 1956	....	....	....	1	66	7,920	....
Jarahueca, 1943	....	1,250	....	7	18	900,545	38
Jatibonico, 1954	....	1,500	....	30	824	1,141,942	15
Motembo, 1885	....	1,000	....	....	*12	2,255,500	62
Santa Maria, 1955	....	3,000	....	8	68	43,070	28
Total			....	65	1,143	4,488,907	

*Naphtha production from more than 200 stripper wells in field.

CUBA REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Bbl. per stream day— Cracking	Other processing—
Capetrol Oil Ref. Co.—Havana	(1)	.....	.....
Esso Standard Oil Co. S.A.—Belot	35,000	24,000 FCC	2,500 Pwr., 2,400 Hyd, 1,000 Poly
Petrolea Jarahueca—Jarahueca	200	.....	.....
Refineria Cabaiguan, S.A.—Cabaiguan	2,000	600 TC	.....
Cia. Petrolera Shell de Cuba—Havana	27,000	.....	5,000 Pf
The Texas Co.—Havana	20,000	.....	3,300 Pf, 4,100 CH
Total	84,200	24,600	

(1) 10,000-15,000-bbl. refinery planned.

PUERTO RICO REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
Caribbean Refining Co.—San Juan	13,500	13,100 FCC	9,000 V, 500 Poly
Commonwealth Oil Refg. Co., Inc.— Guayanilla[1]	58,800	53,600 HD	34,500 V, 7,460 HF, 2,370 Poly, 3,000 A
Total	72,300	66,700	

(1) Plan to add visbreaking and cat. hydrodesulfurization facilities.

NETHERLANDS WEST INDIES REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
Lago Oil & Transport Co., Ltd.—Aruba	440,000	340,000 Vis 43,000 FCC	5,300 Alky, 20,500 V
N.V. Curacoosche Pet. Industrie Mij.— Curacao	210,000	120,000 TC 33,000 FCC	16,000 TR
Total	650,000	536,000	

(1) Includes 50,000-bbl. gas-oil cracking and 16,000-bbl. thermal reforming, normally operated for visbreaking.

PANAMA REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
Panama Ref. & Petrochemical Co., Inc.— Portobello Harbor[1]	.....	.....	.....
D. K. Ludwig—Las Minas Bay[2]	.....	.....	.....

(1) 55,000-bbl. $33,000,000 refinery contracted to Foster Wheeler Corp. (2) Planned: 70,000-bbl. refinery.

ARGENTINA

ARGENTINA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Calefa	....	....	....	....	.....	.....	...
Comodoro Rivadavia, 1925	....	3,400-6,900	2	433	8,334	94,708,358	24.2
Mendoza	....	....	....	....	.....	.....	...
Neuquen	....	....	....	....	.....	.....	...
Salta	....	....	....	....	.....	.....	...
Total	....	....	....	....	*90,000	642,346,500	

*Estimated.

ARGENTINA REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
Cia. Condor—Avellaneda	900	.....	.....
Cia. La Isura, S.A.—Bahia Blanca	2,000	.....	.....
Diadema Argentina, S.A. de Petroleo— Buenos Aires	23,000	17,000 TC	3,000 TR
Esso Refinadora de Petroleo:			
Bahia Blanca	5,500	.....	.....
Campana	25,000	(1)	.....
Dadin (Plaza Huincul)	500	.....	.....
Manuel Elordi	1,300	.....	.....
Lottero y Papini-Avellaneda Ramon Gorleri—Quilmes	1,500	.....	.....
Yacimientos Petroliferos Fiscales:			
Avellaneda	6,000	2,500 TC	.....
La Plata	[2]95,000	18,400 FCC 7,000 TC	.....
Lujan de Cuyo	[3]11,300	9,000 TC	.....
Plaza Huincul	1,300	.....	.....
Comodoro Rivadavia	5,500	2,000 TC	.....
Salta	2,500	1,300 TC	.....
San Lorenzo	16,000	6,200 TC	.....
Total	197,300	63,400	

(1) Propose 13,300-bbl. FCC and 40,000-bbl. crude still. (2) Plan expansion to 123,000 bbl. by 1960. (3) Building 12,500-bbl. crude expansion for 1958 completion.

PERU

PERU PRODUCTION

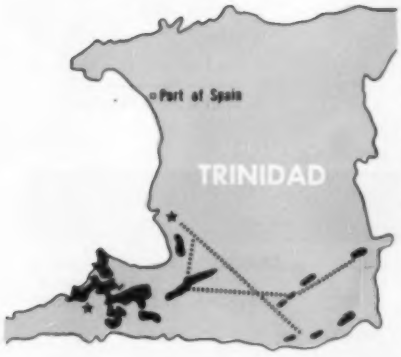
Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Agua Caliente, 1938	....	1,100	10	2	2,500	1,029,537	43.7
Cope, 1938	....	650	....	....	....	....	34.0
La Brea-Parinas, 1888	....	3,000	193	*1,740	28,569	393,054,296	36
Lima Concessions, 1902[1]	....	3,000	99	*1,028	18,519	108,375,395	38.4
Mirador, 1955	....	5,000	....	....	....	....	38
Patria Concession, 1943	....	2,000	....	....	....	....	42
Sector Peru, 1953	....	3,500	....	....	....	....	31.0
Tablazo, 1955	....	6,000	....	....	....	....	33.0
Zorritos, 1863	....	2,000	....	....	....	....	36.8
Total			341	2,903	52,800	502,222,164	

*Artificial lift. (1) Include fields of Lobitos, El Alto, Los Organos, Area "A," (all formerly operated by Cia. Petrolera Lobitos; being operated by International Petroleum Co., Ltd., on 50-50 basis).

PERU REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Cia. de Petroleo Ganzo Azul, Ltd.— Agua Caliente	1,000	....	....
Empresa Petrolera Fiscal—Iquitos	1,200	....	....
International Pet. Co., Ltd.—Talara	47,000	15,200 TC	500 L, 1,350 A
Total	49,200	15,200	

TRINIDAD



TRINIDAD PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Balata-Bovallius, 1952	....	7,200-9,426	....	....	438	....	29-35
Brighton-Vessigny & Adjacent:							
Marine Area, 1908	....	700-7,500	....	....	4,548	....	16-38
Cats Hill, 1953	....	1,400-9,000	....	....	8,259	....	29-46
Forest Reserve-Apex-San Francique-Pt. Fortin East, 1913	....	1,000-16,110	....	....	27,251	....	15-33
Guayaquayare, 1902	....	500-7,919	....	....	2,212	....	15-49
Inniss, 1956	....	5,127	....	....	490	....	33
Kern-Parrylands-Cruse, 1913	....	2,000-10,626	....	....	8,176	....	13-30
Moruga, 1953	....	9,693	....	....	812	....	11-30
Oropouche, 1954	....	2,000-9,077	....	....	1,278	....	35
Palo Seco-Los Bajos, 1926	....	460-10,000	....	....	10,404	....	16-33
Penal-Barrackpore, 1918	....	1,300-11,067	....	....	11,923	....	11-35
Point Fortin-Point Ligoure and Adjacent Marine Area, 1908	....	1,000-10,800	....	....	7,392	....	15-45
Quarry-Coora-Quinam-Morne Diablo, 1936	....	280-14,018	....	....	7,237	....	16-30
Total			895	‡2,138	90,420	†567,000,000	

*Daily average for first 6 months 1957. †Estimated. ‡Includes gas-airlift, pumping, plunger lift, etc.

TRINIDAD REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Brighton Terminal, Ltd.—Brighton	4,000	....	....
Trinidad Oil, Ltd.—Pointe-a-Pierre[1]	100,000	30,000 Vis 25,000 FCC	8,500 TR, 1,800 Alky, 4,700 Poly, 55,000 V
Shell Trinidad, Ltd.—Point Fortin	37,000	....	7,000 V, 6,000 A
Total	141,000	55,000	

(1) Building 8,000-bbl. Pf unit, 10,000-bbl. CH unit.

CHILE

CHILE PRODUCTION

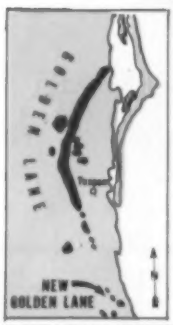
Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Calafate, 1956		6,000	3		264	98,200	42
Chanarcillo, 1950		7,600	3		348	630,900	46
Chanarcillo Sur, 1952		7,500	2		133	153,000	46
Chillan, 1953		7,600	6		1,457	1,066,000	41
Cullen, 1954		6,000	4		241	471,000	42
Delgado, 1952		7,600				1,567	39
Espora, 1949		7,500				4,489	46
Flamenco, 1954		6,500	4		241	94,510	42
Manantiales, 1945		7,500	6		264	1,342,000	42
Manantiales Sur, 1955		7,800				6,300	
Manzano, 1953		4,000-5,000					
Primavera, 1954		7,600					
Sombrero, 1950		7,500	10		2,538	4,232,300	42
Sombrero Norte, 1954		7,250	1			2,296	42
Vertientes, 1956		7,500	1				46
Victoria Este, 1954		7,500	2		437	430,630	46
Victoria Norte, 1950		7,600	2		193	405,400	42
Victoria Sur, 1950		7,500	6		1,285	2,335,400	42
Total			50		7,401	11,273,992	

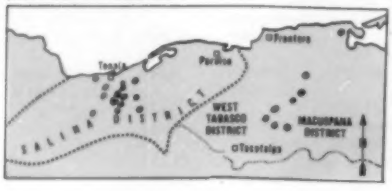
CHILE REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Empresa Nacional del Petroleo—Concon[1]	20,000	4,523 TC 4,960 Vis	3,970 TR
	20,000	9,483	

(1) Building: CR 26,000 bbl., Vac 16,000 bbl., FCC 12,000 bbl., CR (Sinclair Baker) 6,000 bbl., Alky 1,100 bbl.

MEXICO





MEXICO PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Northeastern District, 1948					2,770		48
Tampico, Norte, 1901					23,261		12
Tampico, Sur, 1908					15,796		20
Poza Rica, 1930					109,154		35
Nueva Faja de Oro (New Golden Lane), 1952					47,431		19
Veracruz Central, 1953					12,788		15
Tabasco, 1954					9,781		41
Isthmus of Tehuantepec, 1911					19,150		30
Total					240,131	3,079,413,614	

MEXICO REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Pemex:			
18 de Marzo—Atzcapotzalco[1]	100,000	18,000 TC	39,000 PD, 500 Is., 1,200 Alky
Ing. Antonio M. Amor—Salamanca[2]	40,000	5,300 TC	9,000 PD, 2,600 L, 15,000 V, 800 A
Madero—Madero[3]	89,000	8,000 Vis	11,500 PD, 3,200 A, 18,000 V
Arbol Grande—Arbol Grande	40,000		2,750 A
Mata Redonda—Villa Cuauhtemoc	14,000	10,000 Vis	
Reynosa—Reynosa	10,000	2,000 TC	
Poza Rica—Poza Rica de Hidalgo	97,000		240 tons sulfur
Minatitlan—Minatitlan[5]	54,000	12,000 TCC	1,400 Poly, 22,000 V
Total	444,000	55,300	

(1) Building: Vacuum unit 50,000 bbl., FCC (Esso Model IV) 25,000 bbl. Planned: Alkylation unit expansion, and poly unit for tetramer. (2) Building: 30,000-bbl. crude capacity. Planned: 10,000-bbl. FCC type not determined. (3) Building: 100,000-bbl. crude capacity, 50,000-bbl. vacuum, 25,000-bbl. FCC, sulfur-recovery unit. Planning poly unit, type and size undetermined. (4) Includes 90,000-bbl. crude stabilization unit. (5) Building: 7,000-bbl. crude capacity, 28,000-bbl. crude stabilization, 4,000-bbl. vacuum. Planning lube capacity 800 bbl.

BRAZIL

BRAZIL PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells* Flowing	No. of wells* Pumping	Production in bbl. Daily†	Production in bbl. Cumulative	Gravity °A.P.I.
Agua Grande, 1951	....	4,251	20	....	12,875	3,693,740	40
Aratu, 1942	....	2,585	3	....	(‡)	57,200	..
Candeias, 1941	....	3,999	55	....	5,485	6,335,580	32
Dom Joao, 1947	....	1,149	55	....	2,214	1,929,300	22
Itaparica, 1942	....	2,460	5	....	123	324,400	36
Lobato, 1939	....	1,772	1	....	2	83,700	32
Mata de Sao Joao, 1951	....	3,628	10	....	2,033	392,800	40
Pedras, 1950	....	976	....	....	.....	.....	..
Paramirim, 1950	....	3,843	....	....	.....	135,000	34
Pitanga, 1945	....	6,749	....	....	.....	.....	42
Pojuca, 1953	....	4,775	2	....	448	22,500	41
Rio da Serra, 1950	....	600	....	....	.....	.....	..
Total	.....		151	....	23,180	12,974,220	

*Partially estimated. †Average first 6 months 1957. ‡Gas field.

BRAZIL REFINING

Company—Refinery location—	Bbl. per stream day Crude	Bbl. per stream day Cracking	Other processing
Cia. de Petroleo da Amazonia, S. A.— Manaus	5,000	2,000 FCC	.....
Destilaria Rio Grandense de Petroleo— Uruguaiana	300	.....	.....
Industrias Mafarazzo de Energia—Sao Paulo	500	.....	.....
"Ipiranga" S.A., Rio Grande do Sul— Rio Grande	7,000	2,000 TC	60 A
Refineria de Manguinhos, S.A.—Rio de Janeiro	10,000	7,000 Vis	.....
Refineria Uniao, S.A.—Capuava	20,000	24,000 TCC	.....
Petrobras, S.A.: Cubatao	65,000	7,000 TC 25,000 Vis	3,000 A, 10,500 TR, 6,000 Poly
Mataripe	6,000	2,500 TC 2,800 Vis	300 poly
Rio de Janeiro	.....	.....	.....
Petrobras, S.A. (Fabrica de Asfalto)— Cubatao	.....	.....	2,320 A
Total	113,800	72,300	

(1) Adding 31,000-bbl. crude capacity, 22,000-bbl. vacuum, 500-bbl. polymerization, 20,000-bbl. fluid catalytic cracking, and 2,800-bbl. lube plant.

URUGUAY

URUGUAY REFINING

Company—Refinery location—	Bbl. per stream day Crude	Bbl. per stream day Cracking	Other processing
Administracion Nacional de Combustibles, Alcohol y Portland Refineria ANCAP-Montevideo—Teja[1]	28,000	[2]2,000 TC	750 V, 350 A
Total	28,000		

(1) Building: 28,000-bbl. crude, 10,000-bbl. vacuum, 5,000-bbl. FCC Orthoflow "B," 3,000-bbl. CR Sinclair-Baker-Kellogg, and 3,000-bbl. asphalt. (2) Also operates as atmospheric unit.

Europe

Production and Refining Capacity

BARRELS PER DAY

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY	COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
ALGERIA	200		NETHERLANDS	29,700	349,000
AUSTRIA	59,100	46,910	NORWAY		1,800
BELGIUM		162,900	PORTUGAL		22,900
DENMARK		635	SOUTH AFRICA		21,100
FINLAND		18,000	SPAIN		132,700
FRANCE	27,800	633,600	SWEDEN		47,500
FR. MOROCCO	1,500	2,300	TURKEY	6,300	6,950
GERMANY (WEST)	77,500	357,250	UNITED KINGDOM	1,700	638,800
GREECE		30,000	WEST AFRICA	3,500	2,000
ITALY (Incl. Sicily)	25,900	590,295	YUGOSLAVIA	7,600	

UNITED KINGDOM

UNITED KINGDOM PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Caunton, 1943	60	2,000-2,200	....	10	25	230,000	27.8
Duke's Wood, 1941	400	1,800-2,500	....	108	529	3,426,000	33.6
Eakring, 1939	200	1,800-2,500	....	44	121	1,894,000	33.6
Egmanton, 1955	1,050	3,100-3,400	....	18	660	169,000	39.1
Formby, 1939	20	85-130	....	10	2	71,000	34.1
Kelham Hills, 1941	350	2,000-2,500	....	43	301	1,691,000	27.8
Plungar, 1953	250	2,800-3,080	....	6	59	74,000	32.2
Total			....	229	1,697	7,555,000	

UNITED KINGDOM REFINING

England

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Berry Wiggins & Co., Ltd.:			
Rochester	4,300	.....	2,500 V, 1,500 L
Weaste	3,300	.....	.....
B.P. Refinery (Kent) Ltd.—Isle of Grain	[1]100,000	12,500 FCC	34,000 V, 6,000 Pf, 2,750 L
Esso Petroleum Co., Ltd.—Fawley[2]	160,000	41,000 FCC	15,000 Fhy, 5,000 Hyd, 4,000 L, 10,500 Poly, 40 T/day S
Lobitos Oilfields, Ltd.—Ellesmere Port	4,000	1,000 TC	.....
Manchester Oil Refg. Ltd.—Manchester	3,500	.....	2,500 V, 1,500 L
Mobil Oil Co., Ltd.—Coryton[3]	30,000	10,800 TCC	15,000 V, 5,400 Sf, 2,500 L
Shell Refg. & Marketing Co., Ltd.:			
Heysham	36,000	6,000 Vis	4,000 TR
Androssan	3,200	.....	.....
Shell Haven[4]	75,000	.....	10,000 TR, 6,700 Pf
Stanlow	100,000	33,000 FCC	10,000 TR, 9,000 Pf
Total	519,300	104,300	

(1) Building 80,000-bbl. crude unit, 12,000-bbl. thermal reforming, 10,000-bbl. Platforming, 20,000-bbl. B.P. Hydrofining, 2,250-bbl. alkylation. (2) Building 70,000-bbl. crude unit, complete 1958. Plan 24,400-bbl. new Hydrofining capacity. (3) Expanding crude capacity 5,000 bbl., completion May 1958. (4) Building 80,000-bbl. crude unit for completion third quarter 1958. Plan 16,000-bbl. hydrodesulfurizer for 1960.

Scotland

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Grangemouth Petroleum Ref.—			
Grangemouth	[1]46,000	12,500 FCC	17,000 V, 500 BPA, 2,200 Poly
Scottish Oils, Ltd.—Pumperston	3,500	1,500 TC	.....
Total	49,500	14,000	

(1) Building 18,000-bbl. crude unit.

Wales

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
BP Refinery (Llandarcy), Ltd.—Llandarcy	70,000	12,500 FCC	25,000 V, 6,000 Pf, 3,500 BPA, 2,000 L, 500 A
Esso Petroleum Co., Ltd.—Milford Haven	([1])	.....	.....
Total	70,000	12,500	

(1) Planning 100,000-bbl. refinery, for completion 1960-61.

Ireland

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Esso, Cal-Tex, Shell Mex. and BP—Whitegate	([1])	.....	.....

(1) Building 39,600-bbl. refinery, to include 9,000-bbl. Powerformer, 5,380-bbl. Hydrofiner.

PORTUGAL

PORTUGAL REFINING

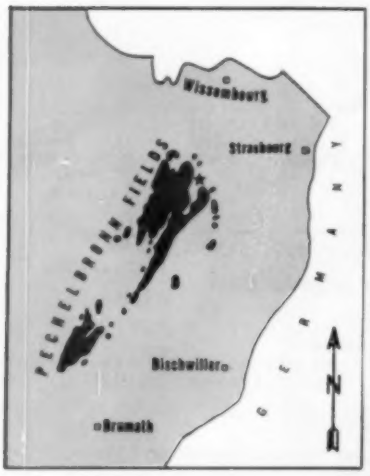
Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
Salor, S.A. Rua do Alecrum 57, Lisbon—			
Cabo Ruivo	22,900	10,600 TCC	1,400 Poly, 190 L
Total	22,900	10,600	

FRANCE

FRANCE PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Donau-Soufflenheim, 1954		1,650	2	10	320		30.2
Eschau, 1956		2,940		3	37		33.9
Gallician, 1951		6,600	3		66	39,470	25.7
Lacq, 1949		2,200	15	17	2,455	11,630,382	21.8
Mothes, 1955		8,150	3		24,279	16,723,011	21
Parentis, 1954		7,700	22	2			32.7
Pechelbronn, 1813		600-4,000	4	340	567	22,543,467	27.5
Reinque, 1955		4,720	4		215		39.8
Schirkhein, 1954		1,780		5	27		28.7
Staffelfeldon, 1952		6,270	1	2	106		40.4
Total					*28,072	52,145,182	

*Daily average first 6 months 1957.



FRANCE REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	—Other processing—
C.F.P.-C.F.R.-Pechelbronn-Antar—Strasburg[1]			
Antar Petroles de L'Antique—Donges	42,000	10,000 TCC	13,000 HF, 400 L
Caltex, S.A.F.—Gironde	25,000	6,600 FCC	11,000 V, 4,500 TR, 500 Poly
Cie. Francaise de Raffinage:			
Gonfreville	72,000	10,000 Vis 30,000 FCC	12,700 TR, 2,400 L, 1,600 Poly
La Mede[2]	118,000	2,000 TC 14,740 FCC	18,500 TR, 860 Poly, 460 CH
Cie. Raffinage Shell-Berne:			
Berre L'Etang	75,000	11,000 FCC 4,700 Vis	11,000 TR
Pauillac	16,500		
Petit Couronne[3]	50,000	12,500 FCC	8,500 TR
Esso Standard, S.A.:			
Port Jerome[4]	85,000	38,550 FCC	14,000 TR, 380 Poly, 4,200 L
Bordeaux[5]			
Mobil Oil Francaise:			
Gravenchon[6]	17,000		6,000 V, 3,700 Sf, 2,300 TR (idle), 1,600 L
Frontignan[7]	26,000	16,200 TCC	2,300 TR
Pechelbronn, S.A.—Merkwiller	4,600		
Ste. Francaise des Petroles B.P.:			
Dunkirk[8]	48,000		9,000 V, 6,800 TR, 1,700 L, 2,000 A
Lavera[9]	54,000		6,000 Pf, 5,000 TR
Total	633,100	156,290	

(1) Cie. Francaise des Petroleos, C.F.R., Pechelbronn and Antar Petroles de l'Atlantique plan 70,000-bbl. refinery to process Algerian crude in 1960-61. (2) Building a 20,000-bbl. Powerforming unit. (3) Building 80,000-bbl. crude unit to replace older equipment. Plan 11,000-bbl. hydrodesulfurization unit, 13,000-bbl. Platformer, for completion third quarter 1959. (4) Building 14,500-bbl. Powerforming unit and 13,600-bbl. Hydrofining unit. (5) Planning 35,000-bbl. refinery including 8,000-bbl. Powerforming unit, for completion in 1960-1961. (6) Building 10,000-bbl. Platformer. (7) Adding 50,000-bbl. crude capacity. (8) Building 5,000-bbl. Sovafiner, completion January 1958, expanding lube capacity in three stages for completion second quarters 1957, 1958, and 1959. (9) Planning 3,700-bbl. Sovaformer, 5,000-bbl. Sovafiner for completion early 1959.

NETHERLANDS

NETHERLANDS PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Andel, 1953	....	3,900-4,700	....	....	.....	5,949	26.4
Benkel, 1954	....	3,600	....	3	97	69,962	32.2
Delft, 1954	....	3,800	1	2	33	74,206	32.0
De Lier, 1955	....	5,300	6	....	1,243	260,999	35.4
Ijsselmonde, 1956	....	3,100	4	....	358	56,828	18.3
Moerkapelle, 1957	....	2,300	1	....	17	1,358	13.3
Pijnacker, 1955	....	5,800	5	....	1,367	572,537	36.0
Ridderkerk, 1957	....	5,000	1	....	.....	8,404	30.2
Rijswijk, 1953	....	5,100	7	....	1,223	1,006,173	30.5
Schoonebeek, 1943	....	2,500	....	272	23,852	54,071,894	25.1
Wassenaar, 1956	....	4,100	3	....	1,074	299,121	17.9
Zoetermeer, 1957	....	3,100	1	....	225	26,374	16.1
Total			29	277	29,732	56,453,805	

NETHERLANDS REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing
N.V. de Bataafsche Petroleum Mij.—Peines[1]	300,000	20,000 TC 66,000 FCC	10,000 TR
Caltex Pet. Maatschappij (Nederland) N.V.—Peines	49,000	9,000 TC	7,500 TR, 7,500 Pf, 12,000 Un, 950 Poly
Esso Nederland—Rotterdam	(2)	.....	.....
Total	349,000	95,000	

(1) Building 12,700-bbl. Platformer, two hydrodesulfurizers, 24,200-bbl. total capacity and 2,800-bbl. alkylation unit, all for second quarter 1958 completion. (2) Plan 100,000-bbl. refinery to include Powerforming and Hydrofining for completion 1960.

SCANDINAVIA

NORWAY REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing
A/S Esso-Raffineriet, Norge—Slagenslagen a Naess	(1)	.....	.....
Norske Esso A/S—Valloy Pr. Tonsberg	1,800	.....	300 L
Total	1,800	.....	.....

(1) Will build 40,000-bbl. refinery to make gasoline, jet fuel, heating oil, diesel oil, heavy fuel and bunker fuel, on the western shore of Oslo fjord. Completion slated for 1960-61.

SWEDEN REFINING

A. B. Nynas - Petroleum:			
Nynasham[1]	14,000	1,000 TC	1,900 TR, 2,500 V, 650 L, 1,900 A
Malmd	1,950	.....	1,500 V, 1,500 A
Gothenburg	2,900	.....	2,300 V, 2,300 A
Kopportranz Oljeaktiebolag—Skaruik[2]	29,000	.....	4,400 TR, 5,500 Cat.
Total	47,850	1,000	

(1) Increasing crude capacity to 35,000 bbl. adding 6,850-bbl. Platformer, and 1,400-bbl. lube unit. (2) Building 40,000-bbl. additional crude capacity, and 8,000-bbl. Shell hydrodesulfurization unit.

FINLAND REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing
Neste Oy Corp.—Turku	18,000	6,000 TCC	3,400 Cat., 500 Poly, 1,300 A
Total	18,000	6,000	

DENMARK

DENMARK REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing
Dansk Mineraloliefabrik—Copenhagen	65	.....	60 V, 60 L
A/S Kalundberg Olienaffinaderi—Kalvanborg	.....	.....	500 .....
L. C. Glad Co.—Copenhagen	70	.....	.....
Total	635	.....	

ITALY

ITALY PRODUCTION (Includes Sicily)

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Cortemaggiore, 1949		6,230					35
Ripi							
S. Giorgio							
Tramutola							
Ragusa (Sicily)		6,000	20		21,000	6,563,100	12-16
Gela (Sicily)		10,560-11,090	2	2	2,040	370,000	7
Total					*25,700	*12,935,340	

ITALY REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
AGIP Mineraria SPA—Cortemaggiore	2,800	5,800 TCC	
Anonima Petroli Italiani (API)—Falconara	26,000	4,000 TC 3,500 Vis	2,700 CR
Aquila Societa Technico-Industriale—Trieste	22,000	6,600 TCC	2,700 TR, 500 Poly,
Asfalti Bitumi-Catramie Derivati—Ragusa	100		
Bianchi Petroli—Cologno Monzese	1,500		
Condor SPA per l'Industria Petrolifera y Chimica—Rho	45,000	12,000 TCC	6,000 Pf, 6,000 CH
Delle Piane—Genoa	1,000		350 Cy
Distilleria Italiana Catrami (DICA)—Carrara	9,200	500 TC	350 Cy
Esso Standard Italiana (SIAP)—Trieste	6,615	1,000 TC	9,000 Pwr., 500 L, 500 A
Garrone—Genoa[1]	25,800		300 L, 5,600 Pwr., 2,000 Hyd., 450 A
Industria Chimica Italiana del Petroleo (ICIP)—Mantova	20,000	4,000 TC	2,000 Pf
ILSEA—Como	2,700	300 TC	500 Cat.
ILSOM—Palermo	(2)		
IPLOM—Genoa	4,160		300 Cy
Industria Raffinaria Oli Minerali (IROM)—Venice	35,000		2,000 Pf, 1,400 Poly, 7,600 TR, 300 L, 7,000 V
Italia SPA Raffineria—Cremona	8,000	6,000 TC	800 Cat.
Lombardia Petroli—Milan	5,800		650 TR
Mobil Oil Italiana—Naples[3]	65,000	13,500 TCC	2,750 V, 900 Poly, 7,100 TR, 350 L, 300 A
NILO—Milan	5,000		800 Cy
Petroli d'Itali—Fiorenzuola d'Arda	4,000	1,800 TC	720 TR
Purfina Italiana, S.P.A.:			
Florence	4,420		600 TR
Genoa	11,000	1,800 TCC	800 Cy, 1,100 A
Milan	5,800		500 L, 1,000 A, 720 Cy
Rome[4]	11,000	1,800 TCC	1,250 A, 720 CR
Raffineria Oli Lubricanti (ROL)—Viguzzolo	1,400		380 L
Raffineria Siciliana Oli Minerali (RASIOM)—Augusta	55,000	4,400 TC	6,200 TR, 7,300 Pwr., 1,500 A, 1,000 Poly
San-Quirico—Genoa	4,500		
S.A.R.N.—Novara	1,700		400 L
S.A.R.O.M.—Ravenna	30,000	5,000 Vis	4,000 HF, 2,000 TR
Sta. per Azioni Raffineria Padana Olii Minerali (SARPOM)—Novara	20,000	5,000 FCC	4,000 TR, 350 Poly, 9,000 V
S.I.R.O.M.—Milan	1,500		
Sta. per l'Industria Italiana (SPI)—Fornovo Taro	2,000		720 CR
Sta. per l'Industria del Petroleo (INPET)—La Spezia	35,000		3,000 TR, 6,700 Pf
Stanic Industria Petrolifera:			
Bari[5]	49,000		7,300 Pwr., 900 A
Leghorn[6]	47,000		4,000 TR, 8,900 Fhy, 2,400 V, 2,100 L, 950 A
S.T.O.I.—Florence	8,600		600 TR, 1,200 CR
Raffineria Volpato—Milan	3,000		
Total	580,595	77,000	

(1) Plan 6,000-bbl. Hydrofiner. (2) Plan to build 12,000-bbl. refinery including 600-bbl. catalytic reformer, in 1958. (3) Building 9,000-bbl. Sovaformer, 10,000-bbl. Sovafiner, expansion to MEK unit, all to be completed in late 1958. (4) Purfina and AGIP will build a 30,000-bbl. refinery to replace nearby Purfina 11,000-bbl. plant. Will move existing TCC unit to new plant and expand to 2,500-bbl. fresh feed capacity. New refinery will process Egyptian crude. (5) Building 26,000-bbl. new crude capacity, 8,000-bbl. Hydrofiner, expanding Powerformer 900 bbl., completion due 1958. (6) Adding 17,000-bbl. crude capacity, 7,950-bbl. Hydrofiner, 200-bbl. lube capacity.

SPAIN

SPAIN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Cia. Arrendataria del Monopolio de Petroleos—Hospitalet	700	.....	.....
Cia. Espanola de Petroleos, S.A.—Santa Cruz de Tenerite, Canary Islands	55,000	3,500 Vis	2,500 V, 3,000 TR, 5,000 Pf, 400 L, 250 A
Refineria de Petroleos de Escombreras, S.A.—Escombreras	77,000	.....	9,000 TR, 11,000 Pf, 460 Poly, 600 L
Total	132,700	3,500	

AUSTRIA

AUSTRIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	Pumping	Production in bbl.—Daily	Cumulative	Gravity °A.P.I.
Aderklaa	.....	.....	.....	.....	700	.....	39-46.5
Goesting	.....	.....	.....	.....	48,096	.....	.....
Matzen-Auersthal	.....	5,200-7,500	.....	.....	1,435	.....	23-41
Muehlberg	.....	.....	.....	.....	4,304	.....	22-29
Neusiedl/Zaya, 1939	.....	2,900	.....	.....	2,427	.....	25
Puchkirchen, 1956	.....	7,750	.....	.....	75	.....	34
Zistersdorf-Gaiselberg	.....	.....	.....	.....	2,020	.....	.....
Total	.....	.....	.....	.....	59,057	.....	

AUSTRIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
A.G. der Shell-Floridsdorfer Mineraloel-fabrik—Floridsdorf	4,500	.....	1,020 L
Mobil Oil Austria—Kagran	3,500	.....	300 V, 100 L
Oesterreichische Mineraloel-verwaltung A.G.:			
Kledering	150	.....	.....
Korneuburg	7,000	.....	.....
Lobau	8,800	.....	.....
Moosbierbaum	7,000	6,000 TC	.....
Schwechat	[1]13,300	5,000 TC	820 L
Voosendorf	2,300	.....	800 L
Richard K. Van Sickle—Neusiedl/Zayo	360	.....	.....
Total	46,910	11,000	

(1) State-owned O. M. & G. plans new refinery at Schwechat, near former Nova plant, with 48,790-bbl. crude capacity, cat reformer, and later cat cracking.

BELGIUM

BELGIUM REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Albatros S.A. Belge pour le Raffinage de Petrole—Antwerp	14,000	4,500 HD	6,000 V, 700 Poly
Belgium Shell Co., S.A.—Ghent	3,000	.....	530 L
Cie. Industrielle "Atlas," S.A.—Antwerp	2,500	.....	.....
Esso Belgium—Antwerp[1]	36,000	10,800 FCC	4,100 TR
Raffinerie Belge de Petroles, S.A.—Antwerp	13,400	.....	2,250 TR, 4,000 V
Ste. Industrielle Belge des Petroles—Antwerp[2]	90,000	10,000 FCC	19,000 V, 3,000 Poly
Tankage & Transport, S.A.—Antwerp-Kiel	4,000	.....	750 Pf
Total	162,900	25,300	

(1) Building 2,500-bbl. vacuum unit, 5,600-bbl. Powerformer, 6,900-bbl. Hydrofiner, 1,200-bbl. asphalt plant. (2) Building 10,000-bbl. Platformer, 10,000-bbl. B.P. Hydrofiner.

ITALY

ITALY PRODUCTION (Includes Sicily)

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Cortemaggiore, 1949	....	6,230	....	....	....	....	35
Ripi	....	....	....	....	....	....	..
S. Giorgio	....	....	....	....	....	....	..
Tramutola	....	....	....	....	....	....	..
Ragusa (Sicily)	....	6,000	20	....	21,000	6,563,100	12-16
Gela (Sicily)	....	10,560-11,090	2	2	2,040	370,000	7
Total	....	....	....	....	*25,700	*12,935,340	

ITALY REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
AGIP Mineraria SPA—Cortemaggiore	2,800	5,800 TCC	....
Anonima Petroli Italiani (API)—Falconara	26,000	4,000 TC 3,500 Vis	2,700 CR
Aquila Societa Technico-Industriale—Trieste	22,000	6,600 TCC	2,700 TR, 500 Poly,
Asfalti Bitumi-Catramie Derivati—Ragusa	100	....	....
Bianchi Petroli—Cologno Monzese	1,500	....	....
Condor SPA per l'Industria Petrolifera y Chimica—Rho	45,000	12,000 TCC	6,000 Pf, 6,000 CH
Delle Piane—Genoa	1,000	....	350 Cy
Distilleria Italiana Catrami (DICA)—Carrara	9,200	500 TC	350 Cy
Esso Standard Italiana (SIAP)—Trieste	6,615	1,000 TC	9,000 Pwr., 500 L, 500 A
Garrone—Genoa[1]	25,800	....	300 L, 5,600 Pwr., 2,000 Hyd., 450 A
Industria Chimica Italiana del Petroleo (ICIP)—Mantova	20,000	4,000 TC	2,000 Pf
ILSEA—Como	2,700	300 TC	500 Cat.
ILSOM—Palermo	([2])	....	....
IPLOM—Genoa	4,160	....	300 Cy
Industria Raffinaria Oli Minerali (IROM)—Venice	35,000	....	2,000 Pf, 1,400 Poly, 7,600 TR, 300 L, 7,000 V
Italia SPA Raffineria—Cremona	8,000	6,000 TC	800 Cat.
Lombardia Petroli—Milan	5,800	....	650 TR
Mobil Oil Italiana—Naples[3]	65,000	13,500 TCC	2,750 V, 900 Poly, 7,100 TR, 350 L, 300 A
NILO—Milan	5,000	....	800 Cy
Petroli d'Itali—Fiorenzuola d'Arda	4,000	1,800 TC	720 TR
Purfina Italiana, S.P.A.:			
Florence	4,420	....	600 TR
Genoa	11,000	1,800 TCC	800 Cy, 1,100 A
Milan	5,800	....	500 L, 1,000 A, 720 Cy
Rome[4]	11,000	1,800 TCC	1,250 A, 720 CR
Raffineria Oli Lubricanti (ROL)—Viguzzolo	1,400	....	380 L
Raffineria Siciliana Oli Minerali (RASIOM)—Augusta	55,000	4,400 TC	6,200 TR, 7,300 Pwr., 1,500 A, 1,000 Poly
San-Quirico—Genoa	4,500	....	....
S.A.R.N.—Novara	1,700	....	400 L
S.A.R.O.M.—Ravenna	30,000	5,000 Vis	4,000 HF, 2,000 TR
Sta. per Azioni Raffineria Padana Olii Minerali (SARPOM)—Novara	20,000	5,000 FCC	4,000 TR, 350 Poly, 9,000 V
S.I.R.O.M.—Milan	1,500	....	....
Sta. per l'Industria Italiana (SPI)—Fornovo Taro	2,000	....	720 CR
Sta. per l'Industria del Petroleo (INPET)—La Spezia	35,000	....	3,000 TR, 6,700 Pf
Stanic Industria Petrolifera:			
Bari[5]	49,000	....	7,300 Pwr., 900 A
Leghorn[6]	47,000	....	4,000 TR, 8,900 Fhy, 2,400 V, 2,100 L, 950 A
S.T.O.I.—Florence	8,600	....	600 TR, 1,200 CR
Raffineria Volpato—Milan	3,000	....	....
Total	580,595	77,000	

(1) Plan 6,000-bbl. Hydrofiner. (2) Plan to build 12,000-bbl. refinery including 600-bbl. catalytic reformer, in 1958. (3) Building 9,000-bbl. Sovaformer, 10,000-bbl. Sovafiner, expansion to MEK unit, all to be completed in late 1958. (4) Purfina and AGIP will build a 30,000-bbl. refinery to replace nearby Purfina 11,000-bbl. plant. Will move existing TCC unit to new plant and expand to 2,500-bbl. fresh feed capacity. New refinery will process Egyptian crude. (5) Building 26,000-bbl. new crude capacity, 8,000-bbl. Hydrofiner, expanding Powerformer 900 bbl., completion due 1958. (6) Adding 17,000-bbl. crude capacity, 7,950-bbl. Hydrofiner, 200-bbl. lube capacity.

SPAIN

SPAIN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
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Cia. Espanola de Petroleos, S.A.—Santa Cruz de Tenerife, Canary Islands	55,000	3,500 Vis	2,500 V, 3,000 TR, 5,000 Pf, 400 L, 250 A
Refineria de Petroleos de Escombreras, S.A.—Escombreras	77,000	.....	9,000 TR, 11,000 Pf, 460 Poly, 600 L
Total	132,700	3,500	

AUSTRIA

AUSTRIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	Pumping	Production in bbl.—Daily	Cumulative	Gravity °A.P.I.
Aderklaa	.....	.....	.....	.....	700	.....	39-46.5
Goesting	.....	.....	.....	.....	48,096	.....	.....
Matzen-Auersthal	.....	5,200-7,500	.....	.....	1,435	.....	23-41
Muehlberg	.....	.....	.....	.....	4,304	.....	22-29
Neusiedl/Zaya, 1939	.....	2,900	.....	.....	2,427	.....	25
Puchkirchen, 1956	.....	7,750	.....	.....	75	.....	34
Zistersdorf-Gaiselberg	.....	.....	.....	.....	2,020	.....	.....
Total	.....	.....	.....	.....	59,057	.....	

AUSTRIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
A.G. der Shell-Floridsdorfer Mineraloel-fabrik—Floridsdorf	4,500	.....	1,020 L
Mobil Oil Austria—Kagran	3,500	.....	300 V, 100 L
Oesterreichische Mineraloel-verwaltung A.G.:			
Kledering	150	.....	.....
Korneuburg	7,000	.....	.....
Lobau	8,800	.....	.....
Moosbierbaum	7,000	6,000 TC	.....
Schwechat	[1]13,300	5,000 TC	820 L
Voosendorf	2,300	.....	800 L
Richard K. Van Sickle—Neusiedl/Zayo	360	.....	.....
Total	46,910	11,000	

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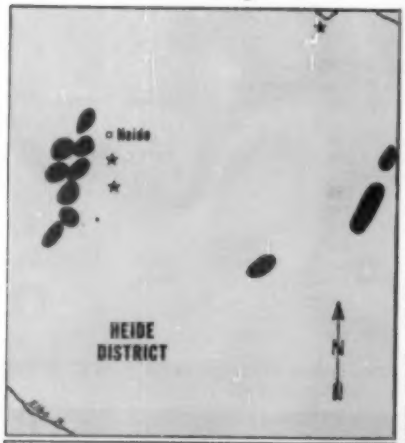
BELGIUM

BELGIUM REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Cracking	Other processing
Albatros S.A. Belge pour le Raffinage de Petrole—Antwerp	14,000	4,500 HD	6,000 V, 700 Poly
Belgium Shell Co., S.A.—Ghent	3,000	.....	530 L
Cie. Industrielle "Atlas," S.A.—Antwerp	2,500	.....	.....
Esso Belgium—Antwerp[1]	36,000	10,800 FCC	4,100 TR
Raffinerie Belge de Petroles, S.A.—Antwerp	13,400	.....	2,250 TR, 4,000 V
Ste. Industrielle Belge des Petroles—Antwerp[2]	90,000	10,000 FCC	19,000 V, 3,000 Poly
Tankage & Transport, S.A.—Antwerp-Kiel	4,000	.....	750 Pf
Total	162,900	25,300	

(1) Building 2,500-bbl. vacuum unit, 5,600-bbl. Powerformer, 6,900-bbl. Hydrofiner, 1,200-bbl. asphalt plant. (2) Building 10,000-bbl. Platformer, 10,000-bbl. B.P. Hydrofiner.

WEST GERMANY



WEST GERMANY PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Bavaria							
Ampfing, 1954		5,900	3	3	566	221,533	20
Heimertingen, 1954		5,030-5,120		6	120	84,372	33-37
Isen, 1954		6,500	1		14	6,245	18
Tegernsee, 1883						32,221	
Total			4	9	700	344,406	
Emsland							
Adorf, 1956	120	4,000-9,000				50,721	30
Emlichheim, 1944	1,000	2,400-9,400		107	3,002	9,638,797	25
Georgsdorf, 1944	1,700	1,600-3,300	134	63	5,841	13,160,297	24-29
Hebelermeer, 1955		3,950		2	7	21,898	30
Lingen, 1942		2,300-3,900	3	242	2,372	7,750,264	30-32
Ruhlermoor, 1949	5,500	2,000-4,000	15	272	7,703	11,784,136	25
Ruhlertwist, 1949	1,500	2,350-2,900			2,881	6,017,448	25
Scheerhorn, 1949		2,500-3,900		74	2,364	3,985,757	30
Total			152	760	24,170	52,409,318	
Hamburg							
Hohenhorn, 1954		7,900				2,351	
Reitbrook, 1937	1,160	1,400-5,500	70	62	1,020	11,307,539	
Total			70	62	1,020	11,309,890	
Hanover							
Blumenhagen, 1957		443		1	7		
Broistedt, 1937	160	2,400-3,200		6	57	441,941	35
Calberlah, 1945	1	160-400		8	7	56,477	22
Eddesse, 1896	100	500-3,300		68	899	3,287,194	26-34
Eicklingen, 1937	50	1,650-3,100		26	219	2,309,567	32-33
Eilte, 1947	5	3,560-3,700		2	616	14,790	23
Eilte-West, 1956		5,670		3		105,124	35
Eldingen, 1949	500	4,900-5,300		46	1,848	4,209,782	35
Fuhrberg-Hambuehren, 1939	3,000	260-2,170		131	630	5,372,035	22-23
Gifhorn, 1935	40	650-1,000		25	28	388,699	16
Hademstorf, 1941	115	4,100-5,400		9	85	794,171	25-29
Hankensbuettel, 1954	2,000	5,000-5,300	37	7	5,006	4,124,454	33
Hardesse, 1957		6,000	1		35	5,820	34
Hohenassel, 1943	60	1,450-2,100		38	382	2,215,367	31
Hohne, 1951	1,000	4,400-6,500	24	20	3,554	6,220,141	33-34
Lehrte, 1952	200	2,000-4,000	3	39	786	959,127	31
Leiferde, 1956		2,700	1	11	715	147,363	34
Lueben, 1955		4,200	2	2	927	269,642	35
Meckelfeld, 1938		1,000-8,600		23	71	454,925	24-32
Meerdorf, 1954		5,370		1	42	6,400	42
Moelme, 1935	100	160-1,800		4	28	1,109,025	32
Nienhagen, 1899	4,720	600-5,350		205	1,593	39,389,587	22-32
Oberg, 1918	560	500-1,900	1	57	127	2,694,379	36-46
Oerrel-Sued-Wesendorf-Nord, 1954		4,460-4,700	1	34	1,154	588,865	
Rautheim, 1955		330		1	7	3,483	
Rietze, 1956		6,000				2,322	
Ruehme, 1954		2,000-2,300		34	673	487,854	
Steimbke, 1936	420	790-3,700	1	199	920	7,372,213	18
Stemmerberg, 1948		4,000				1,119	16
Suderbruch, 1949	2,530	3,800-7,650	2	74	2,910	7,085,183	19-38
Thoeren, 1941	110	1,550-4,100		52	283	1,943,092	31
Vechelde, 1954		6,000				15,604	31
Vorhop, 1952		3,200-6,200	8		850	647,452	36
Wesendorf, 1943	1,200	1,200-6,300	27	58	1,402	6,186,150	17-42
Wietze, 1879	60	300-1,000		62	496	18,245,181	16-29
Total			108	1,246	26,357	117,155,087	
Schleswig-Holstein							
Boostedt-Ploen, 1952		5,550-6,300	16	24	3,646	4,552,836	29-34
Bramstedt, 1954		6,250-6,530	8	5	1,869	1,168,136	34-35
Heide, 1935	900	2,600-5,900	14	51	1,515	12,973,718	21-32
Kiel, 1955		5,750-5,800		11	312	151,484	32
Schwedeneck, 1956		4,900		3	184	23,067	25
Warnau, 1957		8,200	1		14	588	35
Total			39	94	7,540	18,869,829	
Upper Rhine Valley							
Dudenhofen, 1952		5,500-6,300		1	7	7,307	
Forst-Weiher, 1934	230	1,200-2,600		49	28	661,449	32-34
Hayna, 1957		4,500-4,700				694	39
Huttenheim, 1936		5,300		1	7	11,597	31

Landau, 1955	....	3,400-6,400	....	18	942	283,922	36
Leopoldshafen, 1957	....	3,100-4,000	....	....	50	3,505	40
Minfeld, 1956	....	2,700	....	....	57	7,710	..
Rot, 1953	....	2,100-2,500	....	14	120	296,539	25-26
Stockstadt, 1952	350	1,600-5,600	....	19	1,040	873,049	39
Wattenheim, 1954	....	7,500	....	1	35	30,111	..
Weingarten, 1936	....	800-3,600	....	....	42	457,219	31-34
Total			....	103	2,328	3,341,739	
Weser-Ems							
Barenburg, 1953	700	2,300-2,550	22	11	2,386	1,682,733	29
Bockstedt, 1954	....	3,900	....	9	269	374,008	..
Dickel, 1953	....	4,600	....	2	85	14,578	..
Dueste, 1954	....	2,800-4,200	3	146	5,317	4,679,384	..
Elsfleth, 1956	....	5,000	1	1	142	38,805	26
Etzel, 1942	15	4,550-4,700	....	4	42	358,155	13
Hemmelte-West, 1951	1,600	3,700-4,500	22	25	2,549	4,241,367	32
Liener-Garen, 1953	....	2,600-4,500	....	12	127	188,412	28-31
Molbergen, 1953	....	2,400-5,200	....	12	228	340,845	26
Ortland, 1956	....	5,350	....	6	433	44,625	32
Ostenwalde, 1953	....	4,200-4,960	....	20	481	247,764	..
Oythe, 1956	....	3,700	....	2	14	9,409	28.5
Quakenbrueck, 1950	120	1,270-1,950	....	7	35	285,062	35
Siedenburg, 1956	....	2,300-6,600	....	15	319	48,102	25.5
Vechta, 1955	....	5,200-6,500	1	5	290	68,264	39
Voigtei, 1953	....	1,500-1,700	16	45	2,641	1,585,488	31-34
Total			65	322	15,365	14,214,010	
Total West Germany			437	2,596	77,480	217,644,279	

GERMANY REFINING

Company—Refinery location—	—Bbl. per stream day— Crude	Cracking	—Other processing—
Badische Anilin & Soda-Fabrik A.G. Ludwigshafen—Oppau	1,000 SD	.....	200 L
BP Benzin Petroleum G.m.b.H.: Hamburg	45,000	.....	6,000 Pf, 6,500 BHP
Dinslaken[1]	.....	.....	1,500 A
Deutsche Erdoel-AG: Heide	17,500	7,800 TCC	1,600 L, 3,400 Pf
Wietze	800	.....	.....
Deutsche Gasolin AG—Dollberger	2,600 SD	.....	.....
Deutsche Shell AG: Monheim/Reisholz	5,000	.....	1,300 L
Harburg/Wilmhelmsburg/Grasbrook	15,000	.....	2,800 L, 2,300 Pf
Harburg	(2)	.....	.....
Godorf	(2)	.....	.....
Esso AG: Hamburg-Harburg	53,800	9,360 FCC	7,800 Fhy, 8,400 H,
Cologne	(4)	.....	.....
Gelsenberg Benzin AG—Gelsenkirchen	71,000	9,700 TCC	6,500 TR, 15,500 H
Getty Oil Co.—Res	(5)	.....	.....
Gewerkschaft Deurag-Nerog—Misburg	17,200	5,600 TC	2,800 TR, 1,800 L
Gewerkschaft Erdoel Raffinerie Emsland—Lingen-Holthausen	17,200	17,500 HD	3,500 HF, 720 Poly
Gewerkschaft Grief Bergbau Mineraloel-raffinerie—Dollberger	500	.....	.....
Gottlieb Duttweiler—Emden	(6)	.....	.....
Kraftstoff-Hendelsgesellschaft mbH—Essen-Altenessen	1,700	.....	.....
Mineraloel und Asphaltwerks AG—Ostermoor on Kiel-Canal	3,200	.....	.....
Mineraloel Albent Sengewald—Dedenhausen	900	.....	.....
Mineraloelwerke Peine—Peine	400	.....	.....
Oelwerke Julius Schindler G.m.b.H.—Hamburg-Neuhof	4,300	.....	400 L, 200 A
Mobil Oil AG in Deutschland—Bremen[7]	16,000	8,000 TCC	700 L
Purfina—Duisburg	(8)	.....	3,700 Sf, 5,000 H
Ruhrbau GmbH—Muelheim	6,500	.....	.....
Ruhrchemie AG—Oberhausen/Holten	8,100	3,400 TCC 2,200 TC	1,800 TR, 800 H
Ruhroel GmbH.—Bottrop-Welheim	2,600	.....	800 TR
Scholven-Chemie AG—Gelsenkirchen-Buer	21,500	5,200 FCC	2,200 CR, 9,700 H
Union Rheinische Braunkohlen Kraftstoff AG—Wesseling	43,000	11,800 TC	10,400 TR, 9,700 H,
Wintershall AG—Salzbergen	2,300	.....	450 L
Zeller & Gmelin—Eislingen	170	.....	.....
Total	357,270	80,560	

(1) Planning 85,000-bbl. refinery. (2) Completing new 40,000-bbl. refinery including fluid catalytic cracking, Platforming, and expansion of catalytic hydrodesulfurization capacity to 12,000 bbl. by late 1958. (3) New 85,000-bbl. refinery now under construction, for completion in 1960. Will include catalytic reforming and hydrodesulfurization. (4) Building 75,000-bbl. refinery to include 9,000-bbl. Powerformer, 12,200-bbl. Hydrofiner for gas oil, 2,500-bbl. Hydrofiner for jet fuel. Completion due in 1960. Later expansion to 160,000 bbl. planned. (5) Announced plans for new refinery near Cologne. (6) Proposed 30,000-bbl. refinery. (7) Expanding crude capacity with 15,500-bbl. two-stage distillation unit, due for completion in April 1958. Adding 24-ton sulfur-recovery unit to be completed February 1958. (8) Building 21,000-bbl. refinery to be expanded later to 65,000 bbl.

Africa

MOROCCO PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Ain Hamra, 1918	295	400	....	3	.....	.....	36.5
Baton, 1947	....	....	....	10	.....	.....	..
Bou Draa, 1936	....	2,800	3	2	.....	.....	39.2
Bled ed Defaa, 1952	....	....	3	....	.....	.....	..
Mers-el-Kharez, 1951	....	4,300	6	....	.....	.....	36.7
Oued Mellah, 1948	....	1,900	15	....	.....	.....	28.5
Upper Bled ed Doum, 1952	....	3,950	....	11	.....	.....	37.0
Lower Bled ed Doum, 1952	....	4,300	7	....	.....	.....	39.0
Upper Bled Khatara, 1953	....	4,600	....	11	.....	.....	39.5
Lower Bled Khatara, 1954	....	5,200	3	....	.....	.....	40.0
Upper Sidi Fili, 1952	....	3,950	1	5	.....	.....	39.0
Lower Sidi Fili, 1950	....	4,500	12	....	.....	.....	36.7
Tisserand, 1948	....	....	....	....	.....	.....	..
Tslfat, 1932	....	900	....	1	.....	.....	38.2
Lower Zrar, 1955	....	5,600	1	....	.....	.....	35.7
Upper Zrar, 1955	....	....	2	....	.....	.....	..
Total			53	43	1,554	5,667,318	

FRENCH MOROCCO REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Ste. Cherifienne des Petroles—Petijean	2,300	1,800 TCC	.....
Total	2,300	1,800	

ALGERIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Oued Gueterini, 1949	....	1,100-1,600	2	48	346	2,394,756	38.9
Edjele, 1956	....	1,475	(*)	....	.....	.....	...
Hassi Messaoud, 1956	....	10,900-11,200	(†)	....	.....	.....	...
Hassi R'Mel, 1956	....	6,900-7,400	(‡)	....	.....	.....	...
Tiguentourine, 1956	....	1,640-2,625	(‡)	....	.....	.....	...
Total			2	48	346	2,394,756	

*One-well field, shut in awaiting pipeline outlet. †Four-well field, shut in awaiting completion of pipeline due to be completed early in 1958. ‡Two-well field discovery not on production.

FRENCH EQUATORIAL AFRICA PRODUCTION

Gabon

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Ozouri, 1956	....	2,095	6	....	.....	.....	25
Pointe Clairette, 1956	....	2,640-2,810	5	....	.....	.....	33
M'bega, 1957	....	2,560	(*)	....	.....	.....	..
Total Gabon			11	....	3,500	.....	

*Wildcat discovery testing 50 bbl. an hour.

Angola

Benfica, 1955	....	8,400	6	....	.....	.....	27-30
Luanda, 1955	....	5,600	2	....	.....	.....	27-30
Total Angola			8	....	163	90,000	

SOUTH AFRICA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Standard-Vacuum Refining Co. of South Africa, Ltd.—Durban	21,100	(1)9,740 FCC	3,200 V, 1,225 Poly, 480 A, 2,000 TR
Total	21,100	9,740	

(1) Fresh feed capacity 6,300 bbl. per day, considering new Powerforming and Hydrofining units.

WEST AFRICA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Lobito Purfina—Luanda, Angola	(1)2,000	.....	.....
Total	2,000	.....	

(1) Building topping plant, plan much larger refinery later.

Middle and Far East

Production and Refining Capacity

BARRELS PER DAY

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY	COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
AUSTRALIA		207,400	ISRAEL	1,200	85,000
ADEN		120,000	JAPAN	6,200	430,100
BAHRAIN	32,500	211,000	KUWAIT	1,250,000	30,000
BR. BORNEO	116,400	50,000	LEBANON		24,050
BURMA	8,200	6,500	NEUTRAL ZONE	78,000	
EGYPT	52,300	75,000	NEW GUINEA	6,500	
FORMOSA	70	28,000	PAKISTAN	5,800	6,000
INDIA	8,600	98,700	PHILIPPINES		18,000
INDONESIA	312,900	243,800	QATAR	147,000	600
IRAN	689,000	538,300	RUSSIA	1,860,000	
IRAQ	438,600	55,830	SAUDI ARABIA	893,900	189,000

BAHRAIN

BAHRAIN PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Bahrain Zone, 1932	12,300	2,200	....	138	31,600	189,529,400	32
Fouth Pay, 1936	3,100	4,500	....	4	900	2,794,273	36
Total			....	142	32,500	192,323,673	

BAHRAIN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Bahrain Petroleum Co., Ltd.—Bahrain	211,000	16,020 TC 27,300 FCC	34,000 V, 19,950 TR, 10,450 Pf, 10,450 Un, 2,050 Poly, 2,100 A
Total	211,000	43,320	

EGYPT

EGYPT PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Asl, 1948	....	2,870-3,870	6	2	3,300	25,857,462	22
Belayim, 1955	....	5,100-8,700	18	....	*18,500	2,405,325	22-23
Feiran, 1949	....	6,800	2	....	550	498,946	26
Gemsa, 1908	....	400-2,000	....	....	.....	1,445,385	41
Hurghada, 1913	....	700-2,500	....	23	600	39,189,070	22-30
Ras Gharib, 1938	....	1,200-2,500	8	117	22,800	148,453,387	25-26
Ras Matarma, 1948	....	1,940-3,200	1	1	600	403,182	17-18
Rudeis, 1957	....	....	1	....	1,800	.....	..
Total			36	143	48,150	218,252,757	

*Production figures are listed as of July 1. Belayim field is now producing an estimated 20,000 bbl. per day.

EGYPT REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Anglo-Egyptian Oil Fields, Ltd.—Suez	44,000	6,500 TC	.....
Raffinerie de Petrol du Gov't.—Suez[1]	27,000	2,700 TC	1,300 V, 2,700 TR, 500 Poly, 650 A
Societe Egyptienne Pour la Raffinage et le Commerce du Petrole S.G.E.—Alexandria	4,000	.....	.....
Total	75,000	9,200	

(1) Proposed expansion: Crude capacity to 30,000 bbl., vacuum to 10,000 bbl., asphalt to 4,000 bbl. Plan to add 2,700-bbl. Platformer and 2,700-bbl. Hydrofiner, 1,200-bbl. lube plant.

ISRAEL

ISRAEL PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Heletz, 1955	1,600	5,000	14	4	1,200	345,000	30-31
Total			*14	4	1,200	345,000	

*Three wells shut in.

ISRAEL REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Consolidated Refineries, Ltd.—Haifa	85,000	.....	20,000 TR, 1,000 A
Total	85,000	.....	

(1) Refinery operating at less than 25 per cent capacity.

IRAN

IRAN PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Agha Jari, 1937	40,000	4,900-9,800	27	....	430,000	765,724,000	34.8
Gach Saran, 1928	20,000	2,800-6,150	12	....	43,000	143,288,000	31.8
Haft Kel, 1928	19,200	1,900-4,000	15	....	123,000	1,071,412,000	38.3
Lali, 1938	25,600	4,000-9,000	5	....	9,500	21,799,000	37.2
Masjid-i-Sulaiman, 1908	28,800	640-3,600	19	....	42,000	902,542,000	36.7
Naft Safid	19,200	3,000-6,000	8	....	37,500	898,346,000	35.2
Naft-i-Shah	....	5,000	2	....	†4,000	.....	35.0
Alborz (Qum), 1956	....	7,800	(‡)	....	.....	.....	39.0
Total			88	....	689,000	3,803,111,000	

*Average first 6 months 1957. †Estimated. ‡Iran Oil Co. discovery not yet on production.

IRAN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Iraanse Aardolis Raffinage Maatschappij, N.V. (Iranian Oil Refining Co.):			
Abadan	[1]514,000	30,000 FCC	69,000 V, 82,500 TR, 11,000 Alky, 400 L, 5,100 A
Masij-i-Sulaiman	[2]20,000	.....	.....
National Iranian Oil Co.—Kermanshah	4,300	.....	.....
Total	538,300	30,000	

(1) Refinery operating at about 350,000 bbl. (2) Topping plant.

QATAR

QATAR PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Dukhan, 1940	.....	6,550	*36	....	147,000	236,181,000	41.5
Total			36	....	147,000	236,181,000	

*Another 10 wells shut in.

QATAR REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Qatar Petroleum Co., Ltd.—Umm Said	600	.....	.....
Total	600	.....	

NEUTRAL ZONE

NEUTRAL ZONE PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Wafra field:							
Burgan, 1953	9,000	3,600	*41	....	59,799	33,560,000	24
Eocene, 1954	....	1,200	†11	....	7,016	602,000	17
Ratawi, 1955	....	6,900	6	....	11,232	750,000	25
Total			58	....	78,047	34,912,000	

*Plus another five wells shut in. †Plus another 24 wells shut in.

IRAQ

IRAQ PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Ain Zalah, 1939	.....	5,800	3	.....	13,000	34,496,000	31.7
Bai Hassan, 1953	.....	4,900	*8	.....	.....	.....	.....
Butmah, 1952	.....	5,350	*5	.....	.....	5,332,000	29.5
Jambur, 1954	.....	5,700	*3	.....	.....	.....	.....
Kirkuk, 1927	.....	2,750	†21	.....	236,000	1,362,751,000	36.0
Naft Khaneh, 1923	4,000	3,000	‡1	.....	3,562	56,371,000	42.3
Rumaila, 1953	.....	10,850	¶10	.....	107,000	64,253,000	34.7
Zubair, 1949	.....	11,000	§24	.....	79,000	163,051,000	36.0
Total	.....		75	.....	438,562	1,686,254,000	

*Shut in. †Twenty-five wells shut in. ‡One additional well shut in. §Fourteen more wells shut in. ¶Six more wells shut in.

IRAQ REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Government Oil Refineries Administration:			
Baghdad[1]	30,000	10,000 Vis	15,000 V, 10,000 TR, 500 L, 820 A
Qayarah[2]	3,000	.....	2,000 V, 108 A
Iraq Petroleum Co., Ltd.:			
K. 3 (Haditha)	6,450	.....	.....
Kirkuk	2,880	.....	.....
Khanaqin Oil Co., Ltd.:			
Khanaqin	10,250	.....	.....
Muftieh Depot, Basrah	3,250	.....	.....
Total	55,830	10,000	

(1) Doubling crude, vacuum, visbreaking, and thermal reforming capacity. Adding 5,000-bbl. Powerformer. (2) Building 5,000-bbl. crude capacity and 3,000-bbl. thermal reformer.

KUWAIT

KUWAIT PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells— Flowing	Pumping	Production in bbl.— Daily	Cumulative	Gravity °A.P.I.
Burgan, 1938	.....	3,500-4,800	167	.....	.....	.....	30-32
Magwa-Ahmadi, 1952	.....	3,500-4,800	63	.....	.....	.....	30-32
Raudhatain, 1955	.....	9,000-10,000	*1	.....	.....	.....	.....
Total	.....		230	.....	1,250,000	2,330,757,901	

*Awaiting flow line.

KUWAIT REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
Kuwait Oil Co., Ltd.—Mina-al-Ahmadi	[1]30,000	.....	210 A
Total	30,000	.....	

(1) Building 160,000-bbl. crude capacity, 4,070-bbl. Platformer.

ADEN

ADEN REFINING

Company—Refinery location—	Bbl. per stream day— Crude	Cracking	Other processing—
B.P. Refinery (Aden), Ltd.—Aden	[1]120,000	.....	12,000 Pf, 3,500 BPA
Total	120,000	.....	

(1) Building 12,000-bbl. thermal reformer.

SAUDI ARABIA

SAUDI ARABIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Abqaiq, 1941	89,300	6,800	51	....	294,936	1,282,787,451	38
Abu Hadriya, 1940	....	10,115	(‡)	....	.....	9,579	36
Dammam, 1936	11,600	4,850	†27	....	40,399	361,092,418	35
Fadhili, 1949	1,900	9,850	(‡)	....	.....	.....	38
Ghawar, 1948	559,700	7,125	88	....	506,094	1,093,682,112	35
Khursaniyah, 1956	4,900	....	(‡)	....	.....	.....	31
Qatif, 1945	21,300	7,350	10	....	25,349	87,047,452	35
Safaniya, 1951	69,300	5,560	11	....	27,160	4,916,093	27
Total			§187	....	893,938	2,829,535,105	

*Average first 6 months 1957. †Includes three gas wells. ‡One well shut in. §Plus another 59 wells shut in.

SAUDI ARABIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Arabian American Oil Co.—Ras Tanura	[1]189,000	.....	26,000 TR, 15,500 Fhy, 15,000 Hyd, 1,000 Poly, 900 A
Total	189,000	.....	

(1) Building 1,210-bbl. H_2SO_4 alkylation unit.

TURKEY

TURKEY PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Raman, 1941	2,475	4,430	....	*10	4,000	3,877,805	20.9
Garzan, 1951	2,970	4,757	....	†10	2,300	504,450	26.5
Total			....	20	6,300	4,382,255	

*Plus 26 wells shut in. †Plus nine wells shut in.

TURKEY REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Shell, Cal-Tex, B.P., and Socony	(1)	.....	.....
Turkish American Oil Co.—Istanbul	(2)	.....	.....
Turkiye Petrolleri A. O.—Batman	[3]6,950	3,000 TCC	1,850 V, 1,320 A
Total	6,950	3,000	

(1) Plan 65,000-bbl. refinery, site not yet determined. (2) Planned new refinery, 16,600-bbl. crude, 6,400-bbl. vacuum, 2,400-bbl. visbreaking, 4,900-bbl. FCC and 480 bbl. estimated poly. (3) Building 5,200-bbl. crude unit for TCC feed preparation.

LEBANON

LEBANON REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Iraq Petroleum Co., Ltd—Tripoli	11,550	.....	.....
Mediterranean Refining Co.—Beirut, Sidon	12,500	.....	1,200 Pf
Total	24,050	.....	

SYRIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Syrian Government—Homs	(1)	.....	.....

(1) Building 20,000-bbl. skimming plant, due completion July 1959.

PAKISTAN

PAKISTAN PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Balkassar, 1946*	....	8,000	4	....	*3,100	3,800,000	26
Dhulian, 1957	....	7,600-9,200	....	....	.....	.....	36.2-45.0
Joya Mair, 1944	....	7,000	....	....	.....	.....	19.0
Khaur, 1915	....	5,200	....	....	.....	.....	36.0
Total	....		....	....	†5,800	‡8,452,800	

*Pakistan Petroleum, Ltd., only. †Includes operations of Pakistan Oilfields, Ltd., subsidiary of Attock Oil Co. This company will not reveal field data. ‡Estimated.

PAKISTAN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Attock Oil Co., Ltd.—Rawalpindi[1]	6,000	.....	3,500 V
Total	6,000	.....	

(1) Pakistan Government proposes to build a refinery at Karachi.

INDIA

INDIA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Digboi, 1890	....	3,000	37	536	8,600	59,400,000	36
Nahorkatiya, 1953	....	10,000	*3	....			34
Total	....		40	536	8,600	59,400,000	

*Another 20 wells shut in for lack of outlet. Field has productive potential of at least 50,000 bbl. daily.

INDIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Assam Oil Co., Ltd.—Digboi	5,900	1,500 TC	
Burmah-Shell Refineries, Ltd.—Bombay	50,000	12,000 FCC	6,700 Pf
Caltex (India), Ltd.—Visakhapatnam	15,000	8,400 FCC	7,500 V, 850 Poly
Standard-Vacuum Refining Co. of India—Bombay	27,800	[2]9,360 FCC	[3]4,200 TR, 1,225 Poly
Total	98,700	31,260	

(1) Indian Government and Assam Oil Co. plan to build a 30,000-bbl. refinery tentatively located at Baraun. (2) Fresh feed capacity 5,100 bbl. (3) Total feed capacity.

AUSTRALIA

AUSTRALIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
BP Refinery (Kwinana), Ltd.—Kwinana[1]	70,000	12,500 FCC	6,000 Pf, 24,000 V, 5,600 BPH, 500 A
Australian Oil Refining, Ltd.—Kurnell	33,000	15,000 FCC	18,000 V, 1,650 PD
Bitumen & Oil Refineries (Australia)—Matraville[2]	15,000	.....	.....
Commonwealth Oil Refineries, Ltd.—Laverton	[3]4,200	.....	.....
Shell Refining (Australia) Pty., Ltd.:			
Clyde[4]	10,000	.....	.....
Geelong[5]	46,000	15,000 FCC	6,700 Pf
Standard-Vacuum Refining Co., Ltd.—Altona	29,200	[6]15,000 TCC	1,400 V, 5,500 Sf, 1,700 Alky, 1,000 A, 670 L
Total	207,400	57,500	

(1) Building 10,000-bbl. Platformer. (2) Calendar day basis. Building 2,300-bbl. Platformer, 7,000-bbl. Unifiner, adding 50,000 tons per year asphalt capacity. (3) Shut-down. (4) Building 6,700-bbl. Platformer, completion second quarter 1958. (5) Plan 11,000-bbl. hydrodesulfurizer, completion second quarter 1959. (6) Fresh feed capacity 9,200 bbl. per day.

INDONESIA

INDONESIA PRODUCTION

Kalimantan

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Anggana-Muara, 1902	....	380-3,200	*5	80	1,592	68,525,210	21.3-32.3
Balik Papan (Klandasan), 1903	....	740-765	....	....	(†)	245,860	14.5
Bunju, 1930	....	1,970-7,800	34	....	10,178	9,850,560	24.3-33.2
Sambodja, 1910	....	160-4,400	....	48	986	57,032,500	23.3-31.1
Sanga Sanga, 1897	....	430-2,900	‡6	83	2,848	155,364,450	21.0-32.5
Sangatta, 1940	....	1,640-4,200	....	....	....	1,150	36.0
Tandjung, 1938	....	2,500-4,800	(§)	....	¶119	932,800	37.8
Tarakan, 1906	....	195-2,400	2	403	3,496	177,952,750	18.2
Total Kalimantan	....		47	614	19,219	465,905,280	

*Includes two gas wells. †Produced 1,950 bbl. first 6 months 1957. ‡Gas wells. §Field shut in awaiting planned pipeline to Balik Papan. ¶Production for own use.

Ceram

Bula Lemun, 1897*	....	240-920	....	....	....	8,203,000	23.0
Total Ceram	....		....	....	....	8,203,000	

Java

Kawengan, 1926	....	1,750-2,700	2	82	6,831	68,088,240	33.2
Kruka, 1929	....	970-1,600	50	1	554	8,981,130	28.0
Ledok, 1896*	....	320-3,200	....	....	....	21,299,790	43.0
Lidah Kuldon, 1896*	....	490-1,330	....	....	....	33,369,000	24.5
Nglobo-Semanggi-Banjuasin, 1897*	....	370-3,350	....	....	....	18,604,190	43.0
Total Java	....		52	83	7,385	150,342,350	

*No activity.

INDONESIA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
N.V. de Bataafsche Petroleum Mij.:			
Balik Papan	65,000	....	....
P. Brandan	(1)	....	....
Pladju	100,000	10,000 TC	15,000 TR
Tjepu	4,600	....	....
Wonokromo	3,200	....	....
N.V. Standard-Vacuum Pet. Mij.—			
Sungei Gerong[2]	71,000	34,500 TC	[3]4,370 Poly, 25,000 V, 800 Alky
Total	243,800	44,500	

(1) Shut down. Impossible to resume operations. (2) Building fluid catalytic cracking unit, fresh feed capacity 11,400 bbl. per day. (3) Total feed capacity.

BRITISH BORNEO PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Seria, 1929	....	1,300-7,300	128	*170	115,122	386,530,702	19-38
Miri, 1911	....	300-3,050	....	180	1,273	74,469,101	21.5-35
Total	....		128	350	116,405	460,999,803	

*Includes 139 artificial-lift wells.

BRITISH BORNEO REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Sarawak Oilfields, Ltd., Miri—Lutong	50,000	....	....
Total	50,000	....	

BURMA

BURMA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Chauk-Langwa, 1902	....	2,500	14	185	8,100	298,600,000	36
Others	....	....	....	....	100		
Total			14	185	8,200	298,600,000	

BURMA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Burmah Oil Co. (Burma Concessions), Ltd.:			
Chauk	3,000	.....	.....
Syrian	3,500	.....	.....
Total	6,500	.....	

NETHERLANDS NEW GUINEA

NETHERLANDS NEW GUINEA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Klamono, 1936	....	300	1	16	4,907	14,961,260	18.8
Mogoi, 1940	....	1,250	....	20	548	3,996,260	42.8
Wasian, 1940	....	2,900-3,225	3	4	997	1,215,940	41.9
Total			4	40	6,452	20,173,460	

FORMOSA

FORMOSA REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Chinese Petroleum Corp.—Kaoshiung[1]	28,000	4,000 Vis 10,000 TCC	2,000 V, 2,500 Cat., 500 A
Total	28,000	14,000	

(1) Building 900-bbl. alkylation unit.

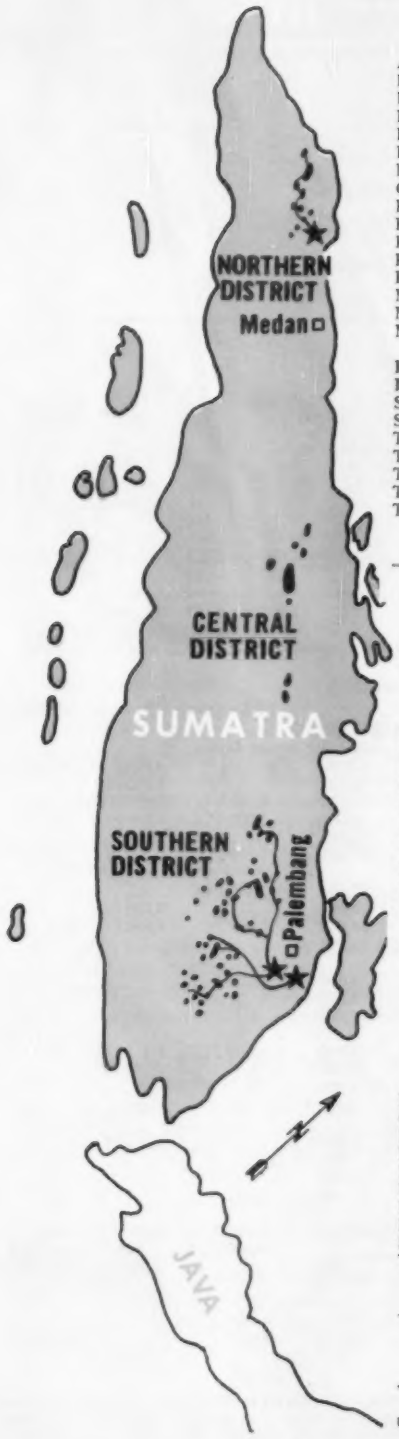
PHILIPPINES

PHILIPPINES REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Caltex (Philippines), Inc.	18,000	7,500 FCC	9,000 V, 950 Poly
Standard-Vacuum Oil Co.	(1)	.....	.....
Total	18,000	7,500	

(1) New 35,000-bbl. skimming plant under development.

SUMATRA



SUMATRA PRODUCTION

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
(Southern District)							
Abab, 1951	....	6,000	....	....	550	1,248,193	35
Babat, 1901	....	100-1,050	1	*16	38	8,452,650	29.2
Badjubang, 1927	....	2,700-3,300	6	*25	2,554	33,437,320	46.5
Benakat, 1933	....	1,500	....	....	12,110	73,365,085	36
Betun, 1949	....	6,500	....	....	900	3,165,689	35
Betung, 1923	....	180-950	....	....	.....	2,165,770	40.5
Djirak, 1930	....	900	....	....	2,945	38,141,873	37
Gunung Kemala, 1938	....	6,070-6,250	16	*5	3,951	12,479,330	38.2
Karang Ringing, 1903	....	160-1,200	....	....	.....	1,510,110	42.5
Kenali Asam, 1931	....	1,700-4,100	20	*87	8,777	58,517,040	23.1-35.7
Kluang, 1914	....	2,300-2,600	....	....	.....	28,704,430	40
Kruh, 1941	....	3,300	....	....	.....	1,444,238	38
Limau, 1928	....	5,100-5,450	42	*17	20,825	35,231,910	29.6
Mangundjaja, 1935	....	660-2,200	....	45	1,464	16,147,330	24.2
Meruo Senami, 1938	....	2,400-2,650	3	2	251	245,960	46.0
Muara Enim Complex, 1903	....	300-1,150	1		450	28,681,570	45.6
Prabumlih West, 1953	....	5,600	9	*2	3,830	4,516,860	33.5
Radja, 1940	....	6,500	....	....	3,370	10,764,873	40
Setiti, 1936	....	1,850-1,970	5	2	1,270	290,200	25.9
Suban Djerigi, 1905	....	1,300-2,500	....	*21	646	36,543,680	48.8
Talang Akan-Pendopo, 1922	....	2,800	....	....	35,790	253,124,348	37
Talang Djimar, 1937	....	3,600-4,200	31	*57	17,586	95,620,550	29.5
Tandjung Tiga, 1940	....	4,400-4,600	7	22	6,277	16,798,190	26.3
Tempino, 1931	....	1,930-2,700	8	91	9,266	59,292,400	45.8
Tg. Luntar, 1912	....	2,200-2,800	....	....	.....	4,312,090	56
Total Southern District			149	392	132,850	824,201,689	

*Includes air-gas and other artificial-lift wells.

(Central Sumatra)							
Bekasap, 1955	400	2,400	....	....	.....	*129	35
Duri, 1940	1,590	730	....	....	.....	*162,192	22
Kotobatak, 1952	400	4,800	....	....	.....	4,896	32
Lirik, 1939	....	1,800	....	....	.....	123,455	34
Minas, 1944†	31,600	2,460	101	19	148,549	114,324,178	36
Molek, 1956	....	2,700	....	....	.....	908	34
Pungut, 1951	600	2,940	....	....	.....	*18,754	....
Sago, 1940	....	1,800	....	....	2,410	1,617,838	34
Sebanga, 1940	300	1,200	....	....	.....	*2,369	....
Ukui-Pulai, 1941	....	1,800	....	....	35	44,110	34
Total Central Sumatra			‡101	‡19	150,994	116,298,829	

*Oil produced for own use only. †July 1, 1954. ‡Incomplete.

(North Sumatra)*							
Djrajeu, 1929	....	2,520-2,590	....	....	.....	559,000	54.5
Gebang, 1936	....	2,970-3,400	....	....	.....	135,000	54.0
Pangkatan Susu, 1917	....	1,550-2,100	....	....	.....	6,287,000	56.0
Pace, 1939	....	2,520-2,590	....	....	.....	559,000	34.5
Pulu Pandjang, 1928	....	1,640-2,400	....	....	.....	11,243,000	55.5
Perlack, 1900	....	160-2,200	....	....	.....	47,870,000	57.0
P. Tabuhan, 1937	....	3,300-3,500	....	....	.....	3,283,000	52.5
Rantau, 1929	....	1,040-2,560	....	....	.....	55,513,000	48.5
Serang Djaja, 1926	....	3,560-4,150	....	....	.....	7,551,000	64.5
Telaga Said D.K.G., 1893	....	210-720	....	....	.....	23,621,000	51.5
Total North Sumatra			....	....	.....	156,062,000	

*No field activity. Installations seized by local government.

Total Sumatra	*807	411	283,844	1,096,562,518	

*Includes 557 producing wells in South and Central Sumatra operated by Standard Vacuum Oil Co.

Total Indonesia	906	1,108	310,448	1,721,013,148	

JAPAN

JAPAN PRODUCTION

Akita Prefecture

Name of field and discovery year—	Proved acres	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °A.P.I.
Asahikawa	....	....	....	....	126	25,496	..
Hachimori, 1938	....	1,480	....	....	72	955,765	26
Innai, 1924	....	2,540	....	....	398	5,228,587	22
Yabase, 1939	....	320-5,580	....	....	3,869	20,209,916	28-36
Others	....	....	....	....	385	(*)	..
Total Akita			....	1,723	4,850	.....	

Yamagata Prefecture

Shonai	....	....	....	....	170	.....	..
Others	....	....	....	....	35	(*)	..
Total Yamagata			....	70	205	.....	....

Niigata Prefecture

Higashiyama, 1983	....	590-2,100	....	....	163	7,505,164	33.4
Niitsu, 1896	....	420-4,270	....	....	426	19,179,163	18.6
Nishiyama, 1897	....	1,050	....	....	349	12,514,320	37.4
Others	....	....	....	....	116	(*)	
Total Niigata			....	1,690	1,054	.....	
Others	....	....	....	212	50	(*)	
Total Japan			....	3,695	6,159	*99,301,560	

*Includes cumulative figures for miscellaneous production.

JAPAN REFINING

Company—Refinery location—	Bbl. per stream day—Crude	Bbl. per stream day—Cracking	Other processing
Asia Oil Co.—Yokohama	11,000	.....	1,200 Pf
Daikyo Oil Co.—Yokkaichi	25,000	3,500 HD	3,000 HF
Idemitsu Kosan—Tokuyama	35,000	7,000 FCC	3,000 Pf
Kita Nippon Sekiyu—Hakodate	12,000	.....	.....
Koa Oil Co.—Marifu	45,000	2,500 TC	3,100 Pf
Maruzen Oil Co.:			
Shimotsu	37,500	3,000 FCC	.....
Matsuyama	10,000	.....	3,000 Pf
Mitsubishi Oil Co.—Kawasaki	54,400	3,000 TC	1,500 Pf, 300 L
Nihon Mining Co.—Funakawa	15,300	.....	.....
Nippon Oil Co.:			
Akita	4,000	1,000 TC	....
Niigata	7,500	.....	.....
Kashiwazaki	1,500	.....	.....
Nippon Pet. Refg. Co.:			
Yokohama	40,000	5,600 FCC	(1)
Kadamatsu	15,000	.....	1,300 Pf
Muroran	7,500	.....	.....
Rekisei Koyo Co.—Niigata	1,400	.....	.....
Showa Oil Co.:			
Kawasaki	27,000	.....	1,500 Pf
Hirasawa	3,000	.....	.....
Niigata	11,000	.....	.....
Yokkaichi	(2)	.....	.....
Toa Nenryo Kogyo Co.:			
Wakayama	47,000	3,900 TC [3]20,000 FCC	4,670 Fhy, 4,500 V, 1,040 Alky, 750 L
Shimizu[4]	7,000	.....	3,400 V, 500 L, 300 A
Toa Oil Co.—Kawasaki	12,000	.....	.....
Taiyo Oil Co.—Kameoka	1,000	.....	.....
Total	430,100	49,500	

(1) Building Platforming unit 3,300 bbl. (2) Building 37,500-bbl. refinery, including 10,000-bbl. FCC unit and 3,000-bbl. Platformer. (3) Fresh feed capacity 10,000 bbl. (4) Building new 27,000-bbl. crude unit, plus Powerforming and Hydrofining units for completion late 1958.

Latin America

The Latin-American refining industry is a sure bet to keep on prospering.

Venezuela already has a big industry, and the government is seeing to it that more oil than ever is processed before export. Local refining facilities are expanding in the biggest consuming countries, Mexico, Brazil, and Argentina. New plants in Cuba and a project in Panama reflect expanding markets in the immediate Caribbean area.

Argentina

Argentina's state oil agency has plans for expanding its refining capacity, but this side of the industry temporarily is taking a back seat to more pressing needs for pipelines and for a drilling program on Tierra del Fuego.

Yacimientos Petroliferos Fiscales (YPF) operates more than two-thirds of the capacity in the country. It plans to complete a 12,500-bbl.-daily expansion at Lujande Cuyo next year, and to expand its La Plata plant to 123,000 bbl. daily by 1960.

Bolivia

Bolivia's modest needs for products are met by the small four plants of the government company, Yacimientos Petroliferos Fiscales Bolivianos (YPFB). New construction of any extent in the near future probably would be limited to upgrading of present facilities.

Brazil

Brazil's state oil agency, Petroleo Brasileiro SA, is making its best headway toward solving the country's oil troubles in the refining side of the industry.

The agency's new 65,000-bbl.-daily Cubatao refinery plus its 6,300-bbl. Mataripe plant accounts for a little more than half the country's total capacity. Private companies have not been allowed to start new projects since Petrobras was created in 1954.

Brazil now refines 83 per cent of its gasoline, and 65 per cent of its other requirements. Petrobras hopes to make the country self-sufficient by 1960.

The most ambitious new project is a 90,000-bbl.-daily refinery at Rio de Janeiro. A contract has been let for a comparatively low cost of $30,000,000. This indicates the plant will concentrate on turning out a few major products, rather than go in for highly specialized processing.

Petrobras also plans to expand its Mataripe plant to 37,000 bbl. daily.

The last refinery started by a private company has gone on stream in the Middle Amazon. It is the 5,000-bbl.-daily plant of Cia. de Petroleo de Amazonas (COPAM) at Manaus.

Chile

The government company, Empresa Nacional de Petroleos (ENAP) has a new 26,000-bbl.-daily crude unit under way at its 20,000-bbl.-daily Concon refinery.

Other facilities in the program are a vacuum-distillation unit, a fluid catalytic cracker, a catalytic reformer, and an alkylation unit.

A 75-mile, 10-in. products pipeline from the refinery to the capital will open early next year. ENAP is building the line jointly with Esso Standard Oil Co. (Chile) Sac. and Cia. Petroleos de Chile (COPEC).

Colombia

Colombia became self-sufficient for oil products this month when International Petroleum Co., Ltd., opened its new 26,500-bbl.-daily refinery at Cartagena.

The refinery is near the Caribbean terminal of the Andian National Corp., Ltd., common-carrier crude

CUBA . . . The Texas Co.'s new 20,000-bbl.-daily refinery is on Santiago Bay, 3 miles south of Santiago de Cuba. Gasoline, kerosine, diesel and fuel oils, and LPG are produced here.

pipeline. It will use crude brought from Magdalena Valley fields.

The government company, Empresa Colombiana de Petroleos, owns the 36,500-bbl.-daily refinery at Barrancabermeja on the Magdalena Valley in the interior. Intercol operates the plant for the government.

Cuba

Three new refineries came on stream this year to give Cuba a processing industry more than big enough to handle its present needs.

The money invested in refining overshadows the sums spent in much-more publicized exploration on the island. Two of the refineries were built from the ground up. These were a 20,000-bbl.-daily plant opened by The Texas Co. at Santiago Cuba, and a 27,000-bbl.-daily plant built by Royal Dutch-Shell at Havana.

A Standard Oil Co. (N.J.) subsidiary expects to have its 35,000-bbl.-daily refinery at Belot open by the end of this year. The plant is at the location of an old 8,500 bbl. daily refinery.

Ecuador

Anglo-Ecuadorian Oilfields, Ltd., will open a new 7,700-bbl.-daily plant in mid-1958 that will make Ecuador self-sufficient for products.

The plant is part of a contract between the company and the government under which the company received better concession terms on its Santa Elena fields. The refinery must be expanded to 10,000 bbl. daily by 1961. The company now has a 5,000-bbl.-daily plant at La Libertad.

Mexico

Petroleos Mexicanos has major expansion programs planned for four of its eight refineries.

Among the current projects are a 100,000-bbl.-daily crude unit, a 50,000-bbl.-daily vacuum unit, and special process facilities at Madero. A 50,000-bbl. daily vacuum unit is under way at Atzcapotzalco near Mexico City. A 30,000-bbl.-daily crude unit is going up at Salamanca.

The new Minatitlan refinery is adding a 7,000-bbl.-daily crude unit, as well as a 28,000-bbl.-daily crude-stabilization unit. A large share of the finished products from Minatitlan are sent to Mexico's West Coast via pipeline across the Isthmus of Tehuantepec. From Salina Cruz terminal, products are shipped up the Pacific Coast, reducing the need for imports from the United States.

Much of the new construction at the older refineries will replace present facilities.

Netherlands West Indies

The two big refineries on Curacao and Aruba Islands make the Dutch West Indies the world's foremost center for refinery exports. Both plants process Venezuelan crude. Lago Oil & Transport Co., Ltd., a Standard Oil Co. (N.J.) subsidiary, operates at 440,000-bbl.-daily plant at Aruba. N. V. Curacaosche Petroleum Industries Mij., a Royal Dutch-Shell company, has a 210,000-bbl.-daily plant on Curacao.

Panama

Panama's first refinery will be a 55,000-bbl.-daily plant built on Portobelo Harbor, northeast of the Caribbean entrance to the Panama Canal.

Two financial men are behind the project. They are John M. Shaheen, of Now York, and Eugene Du Pont III, of Wilmington, Del. The operating company, Panama Refining & Petrochemical Co., Inc., will have a 25-year tax umbrella from the government. Contracts for crude purchases and products sales have been tied down for a decade.

A leading tanker operator, L. K. Ludwig, plans a 70,000-bbl.-daily refinery at Minas Bay.

Peru

The 44,000-bbl.-daily Talara refinery of International Petroleum Co., Ltd., is the largest plant on the West Coast of South America.

Besides meeting its internal marketing needs, Intercol exports about 14,000 bbl. daily, mostly to other countries along the coast.

Puerto Rico

Commonwealth Oil Refining Co., Inc., expanded its Guayanilla Bay refinery to 58,800 bbl. daily this year. This plant and a 13,600-bbl.-daily plant of Caribbean Refining Co. at San Juan supply domestic needs and export products to the United States. They operate on Venezuelan crude.

Trinidad

The Texas Co. is the leading refiner in Trinidad. It owns two of the island's three refineries. These are the 100,000-bbl.-daily Pointe-a-Pierre plant of Trinidad Oil Co., and the smaller, 4,000-bbl.-daily plant of Brighton Terminal, Ltd., at Brighton. Royal Dutch-Shell has a 37,000-bbl.-daily at Point Fortin.

Uruguay

The government-owned Administracion Nacional de Combustibles, Alcohol y Portland (ANCAP) has awarded a construction contract for a second 28,000-bbl.-daily crude unit at Uruguay's only refinery.

The $11,000,000 project includes a new vacuum unit, a fluid catalytic cracker, and a Platformer.

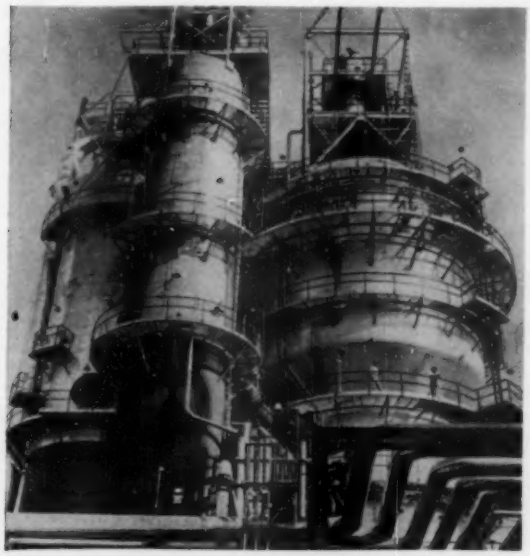
Venezuela

There are two reasons behind Venezuela's growing refining industry.

One is the government's insistence that producers refine at least 15 per cent of their oil in the country. Until last year, the minimum was 10 per cent. The second reason is that producers this year are having record production to start with.

The two leading crude producers both have had major expansion programs under way.

Creole Petroleum Corp. recently opened a new 104,000-bbl.-daily crude unit at its Amuay Bay refinery. The still will process crude from Bachaquero field, producing light naphtha and fuel oil. The unit is the refinery's fourth. It raised basic capacity to 328,000 bbl. daily.



VENEZUELA . . . New catalytic cracking plant at the Cardon refinery of Shell.

Cia. Shell de Venezuela will open a new 80,000-bbl.-daily crude unit at its 170,000-bbl.-daily Cardon refinery next year. Shell last month opened the country's first alkylation and catalytic cracking units.

The company made available for export this year fuel oil formerly burned in Cardon boilers. The refinery shifted to natural gas when the 177-mile, 20-in. Pagline opened. The line can deliver 100 million cubic feet daily from La Paz field west Lake Maracaibo.

The government itself is getting into the picture as a processor. Comparatively small amounts of crude will be needed to feed the petrochemical industry the government will develop.

Western Europe

Western Europe's refining industry is growing faster than any other in the free world.

More than 200,000 bbl. daily of new capacity went on stream this year, raising the total to over 3,000,000 bbl. daily. Another 700,000 bbl. daily is under construction.

Most European countries are sharing in the expansion. West Germany and United Kingdom have the biggest programs under way. The circle of countries with refineries also is widening. Greece and Finland joined the ranks this year. When refineries open in Ireland and Norway, only three countries will be without substantial capacity—Denmark, Luxembourg, and Switzerland.

Crude-oil pipelines are beginning to influence refinery location. Most plants now are built near ports. But crude-oil trunk lines in some cases can permit a more economic location near interior markets. Refineries under way in Germany's Ruhr will take crude from a line from Wilhelmshaven to Cologne. A proposed trans-European system from Marseille to Rotterdam would open the interior of France. German plants also could feed from the system.

The current wave of building is the third since World War II. It began in 1955 to meet climbing demand, especially for heavy fuel oil. This round followed on the heels of a boom sparked by the shutdown of Abadan refinery in 1951. The first round came in the wake of the Marshall Plan after the war.

The Journal's refining survey elsewhere in this issue gives detailed data on all refineries. Here are some of the highlights:

Austria

Austrian refining capacity is largely outdated. Existing plants built before World War II, are small by today's standards.

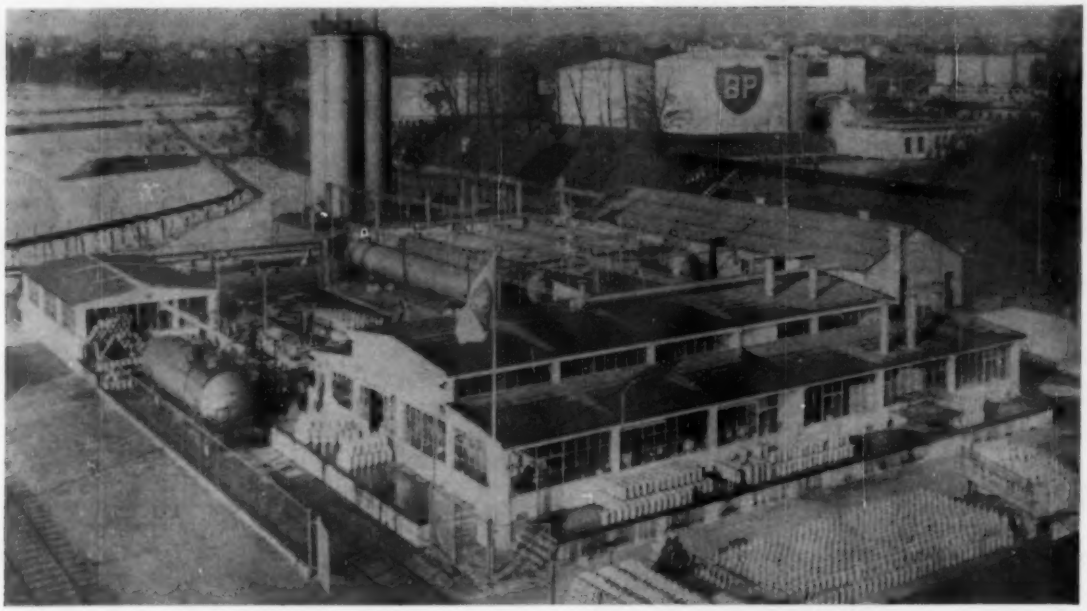
The government refining company, OMV, plans to build a new 48,790-bbl.-daily plant near Vienna by 1960. A crude line from Trieste is under study.

Steps were taken this year to return to private ownership two refineries under the control of various ruling governments since the Nazi invasion. They are a Socony Mobil Oil Co., Inc., plant at Kagran, and Royal Dutch-Shell plant at Florisdorf.

Belgium

Petrofina, the fledgling international oil company, is expanding at home as well as abroad.

The company has enlarged its 65,000-bbl.-daily



DENMARK . . . LPG filling plant at Fredericia, which is operated by British Petroleum Co.'s Danish affiliate, BP Olie-Kompagniet A/S. It has a capacity of about 700,000 cylinder fillings a year.

Antwerp refinery to 90,000 bbl. daily. The plant is owned jointly with British Petroleum Co., Ltd., through Ste. Industrielle Belge des Petroles. A 10,000-bbl.-daily Hydrofiner and a catalytic reformer of the same size will be commissioned next year.

France

Slower growth in French refining is putting the country's industry well back in second place in Western Europe.

A year ago, France and Britain were neck and neck as leaders in total capacity. But extensive as building programs are, French expansion is not matching Britain or West Germany. British Petroleum Co., Ltd., is adding a 50,000-bbl.-daily crude unit at Lavera. Royal Dutch-Shell is replacing older equipment at Petit Couronne with a new 80,000-bbl.-daily crude unit. Esso Standard SAF is building a 30,000-bbl.-daily refinery near Bordeaux. The plant will process Parentis crude.

The proposed trans-European pipeline system would undoubtedly spur construction of refineries in the French interior. Several companies are studying the project under the name Sappeur. The 650-mile, 30-in. crude line would run from Marseille to Rotterdam, via Cologne. Offshoots would extend to Paris, Antwerp, and Strasbourg. Total cost would be as much as $280,000,000.

Greece

The Greek Government is asking for new bids for the operation of its 30,000-bbl.-daily refinery near Athens. The plant was completed this fall. But the government rejected all earlier bids, including an offer by Elbyn, a local corporation.

Ireland

Work is under way on a 40,000-bbl.-daily refinery in County Cork for Irish Petroleum Co., Ltd. The plant will go on stream in 1959. Owners are Esso Petroleum Co., Caltex, and Shell Mex and BP.

Italy

Italy has more refining capacity than it currently needs, and competition is heavy for domestic and export markets.

One new refinery is planned. Purfina, a subsidiary of Petrofina, will build a plant in the Rome area jointly with a subsidiary of ENI, the government oil agency. The capacity will be 30,000 bbl. to 40,000 bbl daily. When the new refinery is completed, Purfina will close its present 11,000-bbl.-daily plant in the same area.

Competition has resulted in some of the best gasoline quality in Europe. Premium has improved 5 to 8 octane numbers in the past year, and is around 98 octane or better in some areas.

Netherlands

The health of the thriving Dutch refining industry is pointed up by the recent decision of Esso Nederland NV to increase the initial capacity of its planned Rotterdam plant from 40,000 to 100,000 bbl. daily.

The country's industry is supported both by comparatively heavy domestic demand and the reexport of finished products. Royal Dutch-Shell's 300,000-bbl.-daily refinery at Pernis is the largest in Europe. Both the Shell plant and the 49,000-bbl.-daily Caltex plant at Pernis completed the addition of special processing units this year.

Scandinavia and Finland

Major additions are being made to the comparatively small refining capacity of northern Europe.

A/S Esso-Raffineriet, Norge, will build a 40,000-bbl.-daily refinery on the west side of Oslo Fjord.

The Standard Oil Co. (N.J.) subsidiary will begin work next year.

In Sweden, Koppartrans Olje AB is expanding its 29,000-bbl.-daily refinery at Gothenburg by 40,000 bbl. daily. It also is adding an 8,000-bbl.-daily catalytic hydrogenation unit using a Shell process.

Finland's 18,000-bbl.-daily refinery near Turku opened this year. It is owned by a government company, Neste O/Y. Russia is supplying half the crude, Royal Dutch-Shell 40 per cent, and Gulf Oil Corp. 10 per cent.

Spain and Portugal

Cartagena is now the larger of Spain's two major plants.

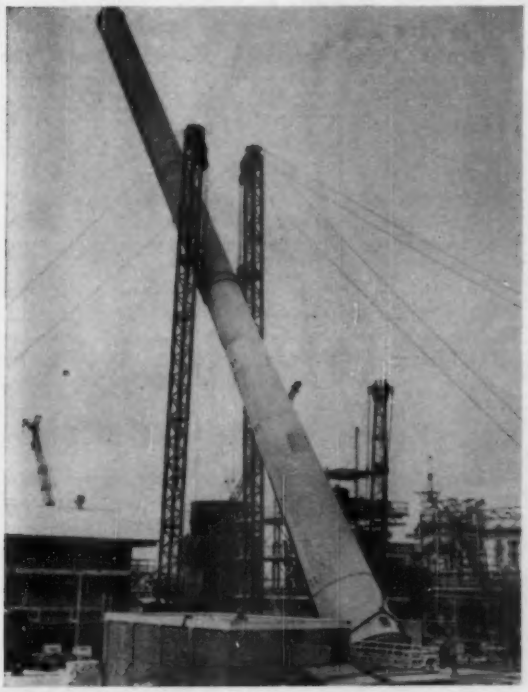
The operating company, Refineria de Petroleos de Escombreras SA, can process 77,000 bbl. daily. The refinery location on the southeast coast of Spain is convenient for Middle East crude shipments. Owners are the government Institute Nacional de Industria, 52 per cent; Cia. Espanola de Petroles, SA (CEPSA), 24 per cent; and Caltex, 24 per cent.

The second large Spanish plant actually is fairly far from Europe. It is off the West African Coast on Santa Cruz de Tenerife, Canary Islands. Crude capacity is 55,000 bbl. daily. CEPSA is the owner.

Most inland demand in Portugal is supplied by a 22,950-bbl.-daily plant near Lisbon. The government owns one-third. S.A. Concessionaria de Refinacao de Petroles em Portugal (SACOR) owns the remainder.

Turkey

An agreement between four companies and the Turkish Government has paved the way for a major refinery. Socony Mobile Oil Co., Inc., Royal Dutch-Shell, Caltex, and British Petroleum Co. Ltd. will build a 65,000-bbl.-daily plant by 1960. The site has not yet been selected. Turkish American Oil Co., backed by private American interests, has plans for a 16,600-bbl.-daily refinery at Istanbul.



ENGLAND... This 250-ft. chimney is part of the new distillation unit of the Kent refinery of British Petroleum Co.

United Kingdom

Three expansion projects will enlarge the country's refining capacity nearly one-third by the end of next year.

They include a newly opened 50,000-bbl.-daily crude unit at the 90,000-bbl.-daily Isle of Grain refinery of British Petroleum Co., Ltd. Special processing units will open in coming months.

Shell Refining & Marketing Co., Ltd., will open an 80,000-bbl.-daily unit at the 75,000-bbl.-daily Shell Haven plant by midyear. Esso Petroleum Co. will complete a 50,000-bbl.-daily unit at Fawley, already the largest refinery in the country.

These units, plus a new 6,000-bbl.-daily crude unit at the Coryton plant of Mobil Oil Co., Ltd., will push total capacity past 800,000 bbl. daily.

The projects will be followed by at least three others. Esso plans a 100,000-bbl.-daily plant at Milford Haven, a deep-water port in Wales capable of handling the biggest tankers. BP will open a new 20,000-bbl.-daily unit at Grangemouth, Scotland, early in 1959. Caltex hopes to have a 50,000-bbl.-daily plant on stream within 4 years.

BP is taking advantage of Milford Haven by building a deep-water terminal and a 60-mile crude-oil line to its Llandarcy refinery.

Much of the increased throughput will be absorbed by a growing petrochemical industry. Monsanto Chemicals and International Synthetic Rubber will complete new plants near Fawley next summer. A growing industry is centered around Grangemouth. A large ammonia plant is going up at Shell Haven, and a new chemical plant is being built nearby.

West Germany

Highlight of the country's refining industry this year was the decision by private companies to build a big-inch crude pipeline from the North Sea to the highly industrialized Ruhr.

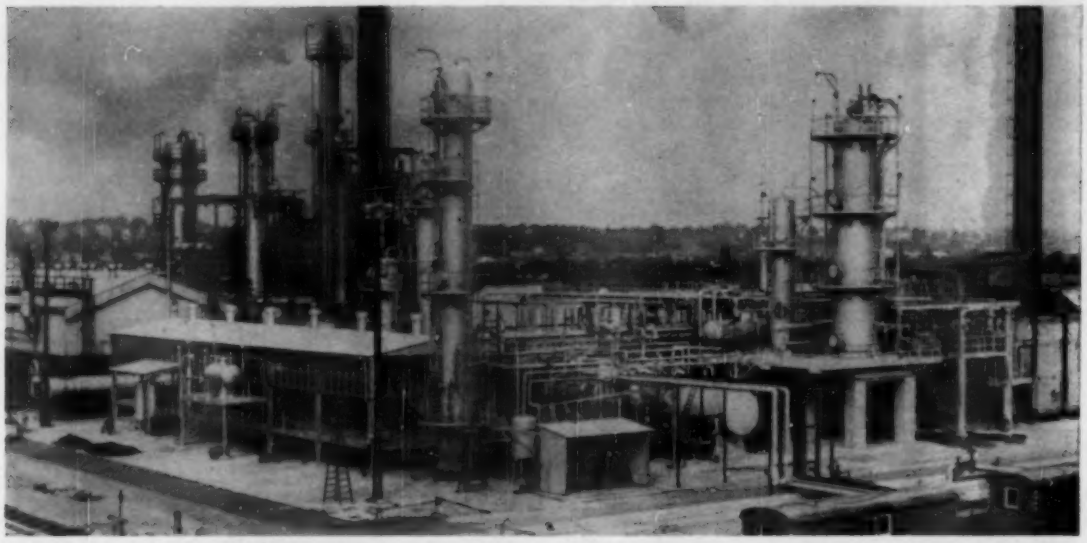
The 230-mile, 28-in. line will extend from Wilhelmshaven to Cologne. It will open in November with an initial throughput of 112,000 bbl. daily, Capacity will increase gradually to a peak of 440,000 bbl. daily in 1975.

The $48,000,000 system will bring heavy concentration of the industry to the Rhine Valley. Esso A. G. has a 68,000-bbl.-daily plant under way at Cologne. British Petroleum Co. and Royal Dutch-Shell have 80,000-bbl.-daily plants under construction in the same area.

Both Esso and BP have an interest in the line, North-West Oil Pipeline Co. Shell is not participating. But Shell has indicated it will take crude from the system. Local companies in the project are Ruhrbau-Mineraloelraffinerie, Ruhr-Chemie, Scholven-Chemie, and Union Rheinische.

Shell is expanding its Hamburg-Harburg refinery. BP has already raised its Hamburg refinery from 32,000 bbl. to 45,000 bbl. daily.

A Petrofina subsidiary also is in the Rhine Valley picture. Purfina will build a plant with an initial capacity of 20,000 bbl. daily at Duisburg-Neuenkamp.



GERMANY . . . The second Hydrofiner unit to come into operation for the BP group has been commissioned at Hamburg refinery. It can remove sulfur from 6,500 bbl. of gas oil daily.

The promise of growing demand is behind the projects. A 19.7 per cent gain in runs is forecast for next year. Throughput will average about 320,000 bbl. daily. Residual-fuel-oil output will rise 54 per cent.

Getty Oil Co. late this year firmed up plans for a $95,200,000 refinery on the Rhine River. It has an option on a 444-acre site near Rees. A tanker terminal on the Rhine is included in the project.

A new company has let a contract for a 30,000-bbl.-daily refinery at Emden. The firm is Erdoelwerke Frisia, AG. It was organized by Gottlieb Duttweiler, a Swiss financier who heads Milgros Cooperative. A gasoline-marketing subsidiary has carried on price wars for years in Switzerland. American Independent Oil Co. has an interest in the new company and will supply Neutral Zone crude under a 15-year contract.

Russia and Romania

The free world knows little about Russian refining, but processing advances probably are not keeping pace with crude production.

The now defunct 5-year plan called for crude capacity of 2,200,000 bbl. daily by 1960. This was 500,000 bbl. daily under the crude-production target. The excess crude could be accounted for by exports, oil used in raw form, and more efficient use of existing refineries.

Cracking capacity was due to hit 1,200,000 bbl. daily. This comparatively high ratio could be due to crude supplies with generally low gasoline yields.

Western visitors to refineries judge developments to be 10 or 12 years behind the United States. Gasoline in general civilian use is about 66 octane.

The Romanian industry can process more than 220,000 bbl. daily, enough to handle domestic crude.

Middle East

The Middle East is a major refining center, even though crude production overshadows the processing side of the business.

All crude producers around the Persian Gulf except the Neutral Zone and Qatar have sizable plants. There also is considerable refining capacity in areas of small or no production bordering the Mediterranean.

Bahrain

Bahrain's 211,000-bbl.-daily refinery far overbalances the island's small crude production. This may someday be an economic lifesaver for the shaikhdom, which may be the first in the Persian Gulf area to run out of crude.

Besides 34,000 bbl. daily produced locally, the refinery uses crude brought in by a 34-mile pipeline from Dhahran, Saudi Arabia. Bahrain Petroleum Co., Ltd., the operator, is a Caltex company.

Iran

Throughput at Abadan is averaging about 325,000 bbl. daily, making it the biggest refinery in the Middle East and one of the largest in the world in terms of runs to stills.

But the 514,000-bbl.-daily plant has never regained the importance it had before nationalization in 1952, when it was a bigger fish in a smaller puddle. Iranian Oil Refining Co. operates the plant. The company is held by Iranian Oil Participants, Ltd., holding company for the consortium group.

Iraq

Unlike its major crude-producing neighbors, Iraq's refining industry depends on internal demand, rather than exports and bunker sales.

The government owns the country's largest refinery, a 30,000-bbl.-daily plant near Baghdad. A major expansion is definite.

Iraq Petroleum Co., Ltd., has two plants which supply local needs in the vicinity of Kirkuk field and Haditha, on the pipeline route to the Mediterranean. British Petroleum Co., Ltd., also has two plants, one at Khanaqin field near the Iranian border, and one at Basrah, near the Persian Gulf.

Israel

British Petroleum Co. Ltd. and Royal Dutch-Shell may eventually sell their 85,000-bbl.-daily Haifa refinery. The question arose when the companies disposed of their marketing outlets in Israel this year. The refinery now processes about 16,000 bbl. daily, meeting local demand. It has operated on a fraction of capacity since Arabs cut the Haifa line of the Iraq pipeline system during 1948 hostilities.

Kuwait

A 160,000-bbl.-daily refinery being built in Kuwait is the only king-sized project now under way in the Middle East. The present 30,000-bbl.-daily plant serves largely as a supplier of bunker fuel to visiting tankers and other vessels. Yields are about 76 per cent residuals, 18 per cent distillates, 4 per cent gasoline, and 2 per cent kerosine.

Lebanon-Syria

Lebanon's two refineries fill domestic demand and supply exports to Syria and Jordan.

Caltex and Socony Mobil Oil Co., Inc., jointly own a 12,500-bbl.-daily plant through Mediterranean Refining Co. Iraq Petroleum Co., Ltd., operates the second, slightly smaller plant.

After lengthly delay, the Syrian Government this year decided to award a contract on a 20,000-bbl.-daily plant to Technoexport, of Czechoslovakia. Firms from several countries had bid on the project.

Saudi Arabia

Throughput at the 189,000-bbl.-daily Ras Tanura refinery has exceeded the rated capacity for several years. Special facilities at the plant were expanded this year when a 15,000-bbl.-daily catalytic desulfurization unit went on stream. As in the case of many major crude-producing countries, the Saudi government is making no secret of its wish to further expand the refining industry within its borders.

Egypt

The Egyptian Government plans to more than double the size of its 27,000-bbl.-daily refinery at Suez.

The project, including several new special process units, would make the refinery the biggest in the country.

Largest plant now in Egypt is the 44,000-bbl.-daily Suez refinery of Anglo-Egyptian Oilfields, Ltd. Egypt last year took over this plant when it sequestered Anglo-Egyptian properties after the invasion. British Petroleum Co., Ltd., and Royal Dutch-Shell each own 31 per cent. The government owns the balance.

A simple 4,000-bbl.-daily crude unit at Alexandria rounds out the refining industry. Caltex has 13 per cent interest.

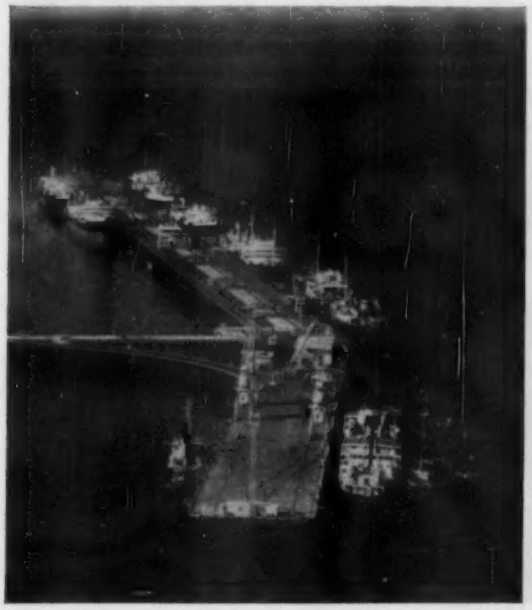
Aden

The 120,000-bbl.-daily refinery of British Petroleum Co., Ltd., at Aden is ideally situated at the bunkering station taking the lead from New York as the biggest fueling port. Yields of residual fuel oils run as high as 60 to 65 per cent. A 12,000-bbl.-daily thermal reformer is under contruction.

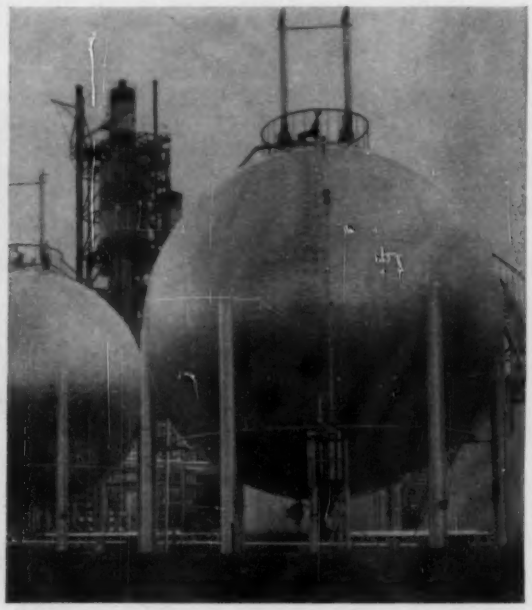
Asia and Australia

Large refining investments are going into countries east of the Persian Gulf, but spending is not on a par with the surge that followed the nationalization of Abadan refinery in 1951.

The biggest consumers, Australia, India, and Japan, now are more or less self-sufficient for most products. Growing demand and a shortage of foreign exchange are prompting new projects in Pakistan and the



KUWAIT . . . This loading pier of Kuwait Oil Co. at Mina al-Ahmadi is one of largest of kind ever built.



AUSTRALIA . . . This aviation-fuel plant at Altona, Victoria, has capacity to produce 42 per cent of Australia's requirements.

Philippines. India needs a plant to process new found crude supplies. Elsewhere, upgrading of old refineries and buttoning-up of earlier projects is continually under way.

Australia

Australia has become self-sufficient for refined products, and it carries on an export trade with New Zealand and other nearby areas.

No complete new projects have been planned since a surge of building sent capacity above 180,000 bbl. daily. The boom was caused by the shutdown of Abadan refinery in 1951, until then a key source of imports. Among additions now under way are Platformers being built by British Petroleum Co., Ltd., and Royal Dutch-Shell.

British Borneo

Sarawak Oilfields, Ltd., is operating its 50,000-bbl.-daily refinery at Lutong at near capacity. The plant processes crude produced by Royal Dutch-Shell in British Borneo.

Burma

Burma became self-sufficient for refined products this year when the rebuilt Syriam refinery went on stream.

The 3,500-bbl.-daily plant is located on the site of the old 21,000-bbl. daily refinery, destroyed by the British in their World War II retreat from Burma.

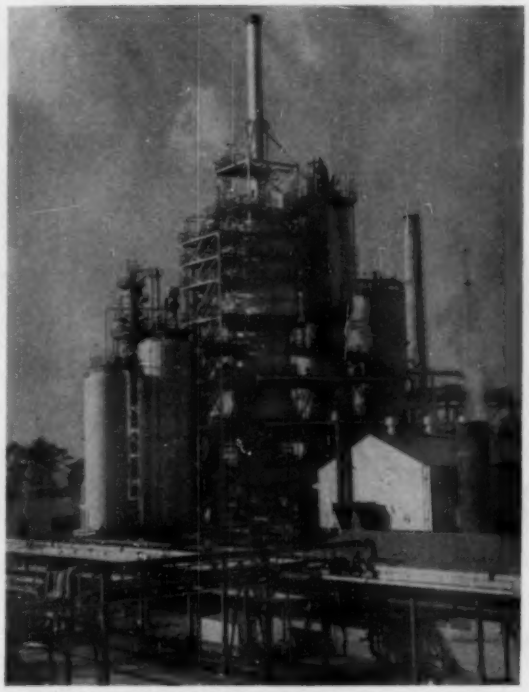
The country's second plant is a 3,000-bbl.-daily refinery at Chauk field.

Formosa

Chinese Petroleum Corp. is further upgrading its 28,000-bbl.-daily refinery at Kaoshiung by adding a 900-bbl.-daily alkylation unit. The government company plans to add hydrogen treating and aromatics extraction units later.

India

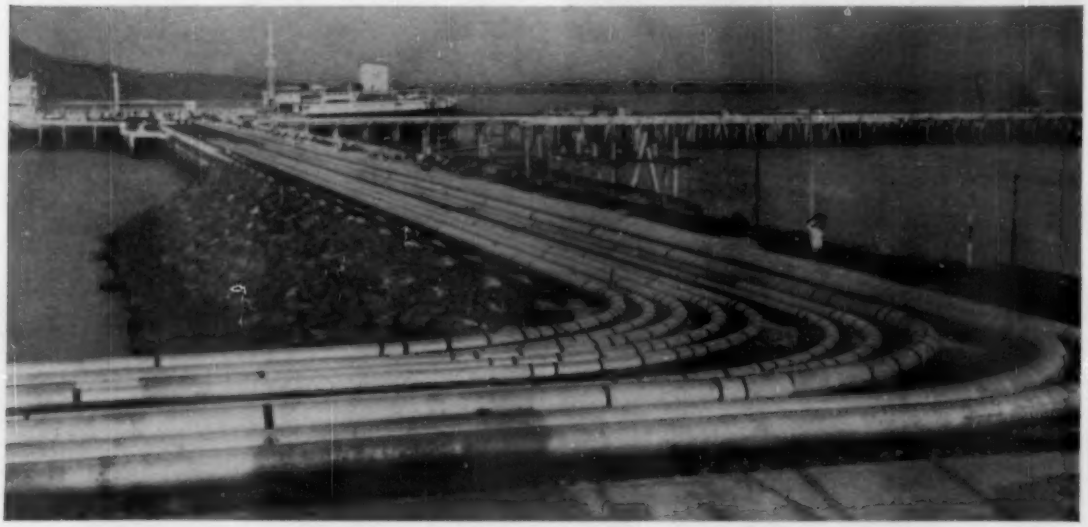
India's third new refinery came on stream this year.



JAPAN . . . This Model IV combination FCC unit is the latest addition to the Toa Nenryo Kogyo K.K. refinery at Wakayama.

Caltex opened the 13,500-bbl.-daily plant at Visakhapatnam, midway down the country's east coast. The new and larger plants of Standard-Vacuum Oil Co. and of Royal Dutch-Shell and Burmah Oil Co., Ltd., are on the other side of the country at Bombay.

Stanvac is stepping up the capacity of its plant from 28,000 bbl. to 33,000 bbl. daily in a 5-year program. The joint Royal Dutch-Burmah Oil refinery is rated at 50,000 bbl. daily.



INDIA . . . One of the three jetties of the marine oil terminal at Butcher Island, 3½ miles off Bombay port, showing oil tanker at berth and set of six submarine pipelines.

Plans for a new refinery to process crude from shut-in Nahorkatiya field in Upper Assam still are in the talking stage. The government and Assam Oil Co., Ltd., a Burmah Oil subsidiary, have agreed on the main points for a joint refining company. India would own two-thirds, Assam Oil, one-third.

The government also has considered building the refinery on its own. Tentative plans call for a 30,000-bbl.-daily plant at Barauni. The Assam Government also has a project of its own in mind.

Indonesia

Royal Dutch-Shell is the leading refiner in Indonesia, with runs exceeding the 172,800-bbl.-daily rated capacity of the four plants it has in operation.

The largest plant operated by N. V. de Bataafsche Petroleum Mij. is at Plaju in southern Sumatra. Throughput at this refinery alone almost equals Shell's total Indonesian crude production.

The second largest plant, at Balikpapan on Borneo, processes more than 65,000 bbl. daily. Smaller plants are located on Java at Tjepu and Wanokromo. Shell is unable to operate its fifth refinery, located at Brandan in hostile north Sumatra.

Standard-Vacuum Oil Co. is the young republic's second refiner. The company is spending $31,000,000 out of an $80,000,000 expansion program in the country for special process units at its 71,000-bbl.-daily refinery near Palembang, Sumatra.

A newly-opened 11,400-bbl.-daily fluid catalytic cracker at the 31-year-old refinery is the first in south-east Asia. Other new facilities include a reformer stabilizer, a catalytic polymerization unit, and a sulfuric acid unit.

Japan

Japan's big, modern refining industry has almost no resemblance to the bombed-out facilities permitted to reopen in 1949.

Nearly all of the country's 22 refineries have been completely rebuilt or were newly built since then. One more is under construction. Showa Oil Co. is building a 37,500-bbl.-daily plant at Yokkaichi. Included will be a 10,000-bbl.-daily fluid catalytic cracker, and a 3,000-bbl.-daily catalytic reformer.

Foreign oil companies supplied a large part of the capital needed to rebuild the industry after the war. They are partners in many of the largest Japanese refining firms. Caltex group companies hold half interest in Nippon Petroleum Refining and Koa Oil. Royal Dutch-Shell has half interest in Showa Oil Co., and Tidewater Oil Co. has a similar interest in Mitsubishi Oil Co. Standard-Vacuum Oil Co. holds 55 per cent interest in Toa Nenryo Kogyo.

Korea

The South Korean Government reportedly is studying a bill that would give legal safeguards to a foreign refinery investment. The government said it has invited Gulf Oil Corp., Standard-Vacuum Oil Co., and Caltex to survey the country in view of building a plant.

Pakistan

Four marketing companies are preparing a joint proposal for a major refinery in West Pakistan.

Burmah Oil Co., Ltd., Royal Dutch-Shell, Standard-Vacuum Oil Co., and Caltex are making the offer at the request of the government. Karachi is a probable refinery site. The government has indicated that it wants local capital to participate, as in the case of exploration.

Attock Oil Co., operates the country's only refinery at present. The plant is a Rawalpindi in the west wing.

Philippines

Standard-Vacuum Oil Co. has obtained approval of the Philippines National Economic Council for a 20,000 to 25,000-bbl.-daily refinery in western Luzon. The project still needs approval by the cabinet.

Caltex operates the only refinery in the islands. It is a 18,000-bbl.-daily plant at Batanga, on Luzon's southwest coast.

South Africa

Union of South Africa

The Union of South Africa has the only refining capacity of any size in Africa outside of Egypt.

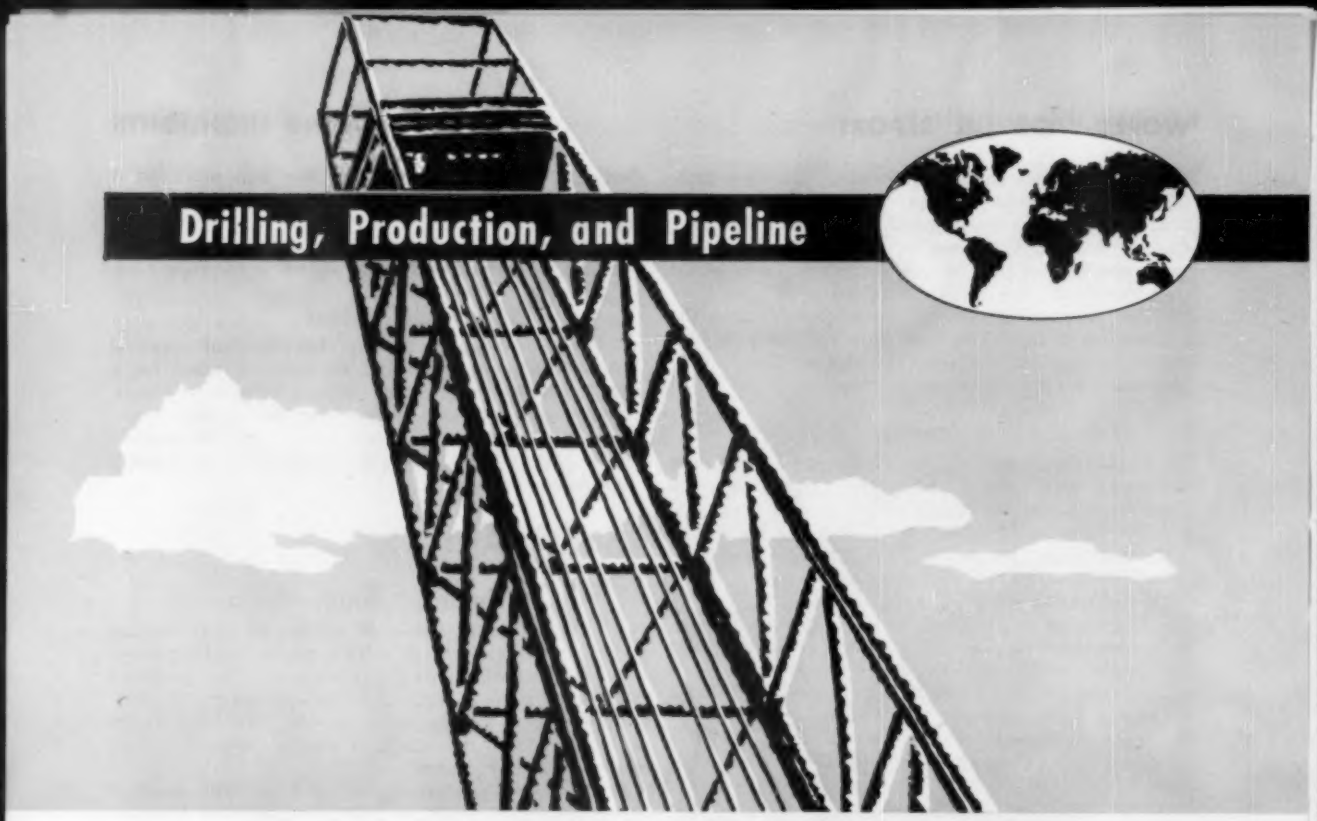
Standard-Vacuum Oil Co. owns the country's single oil refinery, located on the east coast at Durban. Stanvac is expanding the 3-year-old plant from 20,000 bbl. to 25,000 bbl. daily. It also is adding a Powerformer and Hydrofiner.

The Sasol coal-to-oil plant at Coalbrook, south of Johannesburg, is now in full operation after considerable delay. The facility has held the attention of the oil industry as the world's largest synthetic hydrocarbon plant.

Angola

The Portugese Government has approved the immediate construction of a 2,000-bbl.-daily topping plant in Angola, a province on the southwest coast of Africa. Lobito Purfina, a Petrofina subsidiary, will build the unit at Luanda in connection with crude production it is developing. The still will be incorporated into a refinery the company plans to build later.

CANARY ISLANDS . . . Fuel oil is supplied to ships from ports of many seas at this Texaco terminal at Las Palmas, off the African coast.



Drilling, Production, and Pipeline

Latin America

Mexico

Petroleos Mexicanos is counting on deep discoveries in the old Golden Lane area to make up for sharp declines in older fields.

The shift to deep production is going forward quickly. Output from the 11,000-ft. San Andres field rose from 4,000 bbl. to 35,700 bbl. daily in the first 9 months. This kept Mexican production on an even keel. In the same period all other fields dropped from 245,500 bbl. daily to 209,800 bbl. daily.

Pemex has followed up its San Andres find with several other deep discoveries in the same area. The latest and perhaps the best is Gran Morelos. The government company expects the well to test better than 5,000 bbl. daily after acidizing. Gran Morelos 1 was bottomed at 10,518 ft.

Large-scale exports of natural gas to the United States began in August. Pemex is initially delivering 115,000,000 cu. ft. daily from Reynosa absorption plant to a new Texas Eastern Transmission Corp. line at McAllen, Tex. Texas Eastern built a 422-mile, 30-in. extension of its main line from Beaumont to carry the gas. Pemex receives 14.2 cents per M.c.f. in an escalator contract that will add 0.2 cent per year for 20 years. Deliveries eventually will reach 200,000,000 cu. ft. daily.

Central America

British Honduras . . . Shell Petroleum Co., Ltd., late this year obtained 50 per cent interest in a 4,552,000-acre concession held by Gulf Oil Corp.

The operating subsidiary, British Honduras Gulf Oil Co. has two rigs running in the northern part of the country after a lapse of a year. A wildcat at Roaring Creek is below 2,300 ft. The second test, at Tower Hill, is drilling ahead at 300 ft.

Costa Rica . . . Union Oil Co. of California is drilling its sixth well in Costa Rica. The wildcat is located on Victoria dome, 30 miles northwest of the Cocoles area. Since last year's spectacular 2 Cocoles discovery went to water, the company has drilled one other well on the structure and two near Puerto Viejo.

Guatemala . . . Exploration work is rapidly reaching the drilling stage on new concessions.

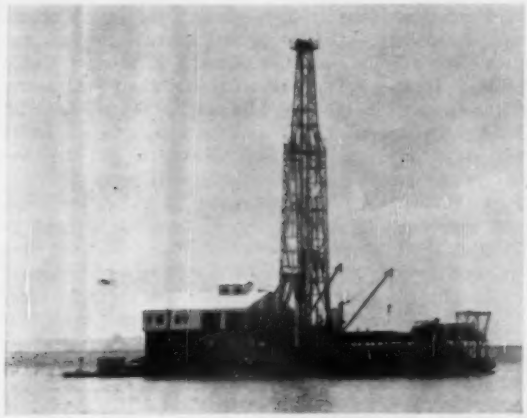
Story J. Sloane, Texas independent, already has a test under way. It is located in the southern part of the concession area. Ohio Oil Co. will spud a wildcat near the Mexican border early next year.

Twenty companies have acquired 39 grants blanketing most of the northern part of the country. The awards were made under the 1955 oil law. They cover 9,350,000 acres in El Peten, Izabal, Quiche, and Alta Verapaz provinces.

Panama . . . Champlin Oil & Refining Co., of Fort Worth, is getting an offshore well under way at Laguna de Chirique in northwestern Panama. The company has one of the many concessions which nearly blanket the country.

Union Oil Co. this year abandoned its 1 Yorkin at 5,500 ft. The well was drilled on a concession opposite its fizzled Costa Rican discovery. Several good shows were found in the Panama well, but no oil.

Nicaragua . . . A three-company group this month abandoned a wildcat 25 miles off the coast of Nicaragua below 14,000 ft. J. Ray McDermott & Co., Inc., Waterford Oil Co., and Warren Petroleum Corp. were the participants. Despite its distance from shore, the barge drilled in only 6 ft. of water.



CUBA . . . Cia. Petrolera de Cuba is drilling a well 1 mile off the northern coast of Camaguey. It is scheduled to go to 12,000 to 15,000 ft.

Cuba

A series of deep tests now planned or drilling will probably go far in determining whether Cuba ever will become an important oil country.

With present production down to 1,000 bbl. daily despite intensive development, interest is centering on the deeper wells financed largerly by major companies.

Gulf Oil Corp. and Cuban Kewanee Oil Co. are below 9,080 ft. in the Collazo 1, located in the northwestern Camaguey province. A few miles north, Cia. Petrolera La Estrella de Cuba is below 1,800 ft. in a projected 12,000 to 15,000-ft. test. The well, 1 Manuay, is a mile off the north coast. Royal Dutch-Shell controls La Estrella. Standard Oil Co. (N. J.) and Atlantic Refining are backers.

Cuban Stanolind will drill off the south shore of Las Villas. Atlantic Refining Co. has a six to nine-well program under way in Pinar del Rio. Siboney-Caribbean Petroleum Co. has a test on the south coast of Camaguey that may go to 10,000 ft.

Other Caribbean . . . Pan Jamaican Oil Co. has given up its third test on Jamaica as a dry hole. The 1 West Negril was located on the southwestern part of the island. It was bottomed at 9,244 ft.

H. S. Cole, Jr., & Son, of Houston, expects to have a well under way in Cibao Valley of Dominican Republic by the end of the year. The company has a 2,100,000-acre concession.

Trinidad

Trinidad crude production inched steadily ahead this year, hitting an all-time high of 96,300 bbl. daily in September.

The progress was due to intensive drilling by operators. During the first 6 months alone, 149 wells were completed, including 131 oil producers

Offshore drilling is getting increasing emphasis. Dominion Oil, Ltd., a subsidiary of Standard Oil Co. of California is below 1,000 ft. in a well drilled from a floating barge. The well is 4½ miles off the west coast of Trinidad, and about 32 miles northeast of the island's first offshore field, Soldado.

Trinidad Northern Areas has converted its Soldado drilling barge into a production station. Work is under way on a second drilling barge in the same area of the Gulf of Paria. TNA owners are British Petroleum Co., Ltd., Royal Dutch-Shell, and The Texas Co.

Ownership of two companies changed hands this year. The Texas Co. acquired full ownership of Antilles Petroleum Co. (Trinidad), Ltd., from McColl-Frontenac Oil Co. Antilles has 53,000 acres under lease on the island of which 900 are proven.

Rio Tinto Co., Ltd., got Kern Trinidad Oilfields, Ltd., when it took over the parent company, Kern Oil Co., Ltd., in a stock exchange. Kern Trinidad has 15,400 acres owned outright or under lease, plus a marine area off its acreage on land. It plans to work with Christiana Oil Corp. in joint offshore operations in the Gulf of Paria.

Argentina

Yacimientos Petroliferous Fiscales got two projects off the ground this year in its uphill struggle to make Argentina self-sufficient for crude.

The biggest move was the award of an 180-million-dollar pipeline construction contract to the TIPSA combine, composed of several United States companies including Fish Engineering Corp.

TIPSA will build two major pipelines. A 1,015-mile, 24-in. natural-gas line will connect Campo Duran field in northern Argentina with Buenos Aires. A 580-mile, 12-in. crude line will connect Campo Duran with San Lorenzo, a river port.

The government oil monopoly also awarded a $3,000,000 drilling contract to Laughlin-Porter Drilling Co., of Midland, Tex. The U. S. firm will drill 40 development wells in Rio Aviles and Arroyo Gama fields on the Argentine side of Tierra de Fuego.

YPF expects to increase its daily average for the year to 78,100 bbl. Output on old properties held by subsidiaries of Royal Dutch-Shell, Standard Oil Co. (N. J.), and two local companies is declining. About 13,000 bbl. daily is produced in these private operations. There is little hope for new concession rights in the immediate future.

Bolivia

The Bolivian Government still is parceling out concessions under its revised 1955 oil law that has turned the country into up-and-coming exploration territory.

The block of key interest at present is an 108,000-acre tract south of the old McCarthy concession. Several bidders are waiting for the government to name a winner of the area, which borders Argentina's prolific Salta province.

Two big awards were made earlier in the year. Shell Prospecting Co. acquired rights on 4,740,000 acres north and east of Santa Cruz, and north and east of present Yacimientos Petroliferos Fiscales Bolivianos production. A three-company group composed of Standard Oil Co. (Ohio), Pure Oil Co., and Hancock Oil Co. won rights on more than 1,232,000 acres southeast of Santa Cruz.

Gulf Oil Corp. is moving ahead with its exploration program. It obtained exploration rights last year on 3,750,000 acres in YPFB reserved lands, plus 4,000,000 acres outright.

Gulf is helping YPFB finance a $10,000,000 crude-oil pipeline from Sica Sica to the Pacific Coast at Arica, Chile. Work will start in March on the 217-mile, 8 and 10-in. line. It will be able to move 6,000 bbl.

daily from the system now delivering crude to Central Bolivia from Camiri field. The line will cross a plateau of the Andes Mountains. It will require four pressure-reducing stations in a 15,000-ft. drop to the sea.

Four American companies took over the 900,000-acre McCarthy concession this year. Chaco Petroleum SA, a subsidiary of Tennessee Gas Transmission Co., will be the operator. Others are Union Oil & Gas Corp., Lion Oil Division of Monsanto Chemical Co., and Murphy Corp.

Brazil

Petroleo Brasileiro SA is enjoying its best year of crude production due to increased output in Bahia fields.

The government oil corporation maintained the gains made last year when new outlet facilities were opened. Petrobras expects to average 27,400 bbl. daily for the year. A peak of 30,000 bbl. daily was hit in August.

The best long-range hope for large-scale production continues to be the vast Amazon Basin. The best encouragement since the Nova Olinda discovery 2 years ago came when an offset yielded 12 to 16 bbl. of crude on a 40-minute drill-stem test. High-pressure pay was topped at 8,977 ft.

Some Brazilians still wish to loosen the grip of Petrobras on the industry. But one proposed bill was met with sharp local criticism.

Colombia

Colombia has been a major exploration country for decades, and several developments this year kept the kettle boiling.

International Petroleum (Colombia) Ltd. has a promising discovery in the upper valley of the Magdalena River. Gualanday tested 840 bbl. daily of 38°-gravity crude through a ⅝-in. choke on a 3-day test. The nearest crude production of importance is the 23,000-bbl.-daily field 120 miles upriver, operated by Texas Petroleum Co.

ARGENTINA . . . Offshore producing wells in Comodoro Rivadavia field.

Production tests have begun on the new Colombian Petroleum Co. field in the lower valley of the river. The wholly owned subsidiary of Socony Mobil Oil Co., Inc., and The Texas Co. has completed seven Cicuco wells. The 7 Cicuco tested 2,140 bbl. daily of 39°-gravity crude. The No. 4 well has tested 3,100 bbl. daily on a ¾-in. choke. Geologists call the discovery the most significant find of last year.

Colombian Sun Oil Co. made its second exploration agreement this year when it took half interest in 750,000 acres held by Socony Mobil and Intercol. Sun will drill two 9,000-ft. wildcats as its side of the agreement. The acreage is in eight blocks in the Sinu area. Pure Oil Co. and United Carbon Co. joined with Sun in the venture.

Sun's first farmout contract was signed at the turn of the year. It acquired 50 per cent interest in 450,000 acres held by Intercol.

Ecuador

A Standard Oil Co. of California subsidiary has created interest in prospects outside the Santa Elena Peninsula with a test on the west flank of Progreso basin.

The 1 Domingo encountered important oil and gas shows below 2,000 ft. The well is 60 miles south of present small production on Santa Elena.

Anglo-Ecuadorian Oilfields, Ltd., has a revised concession agreement on its 320-sq.-mile area which is ths source of the bulk of the country's output. Under the terms, rights expire in 1977, plus a 10-year option. In return, the company is building a new refinery.

Manabi Exploration Co., Inc., has the only other production, over 1,000 bbl. daily in the Santa Elena area.

Paraguay

Pure Oil Co. within a few months will drill its first wildcat on a 14,500,000-acre concession obtained this year. The concession lies in the Chaco Boreal region, bordering Bolivia. Williams Brothers Sudamericana, has 50 per cent interest.

Peru

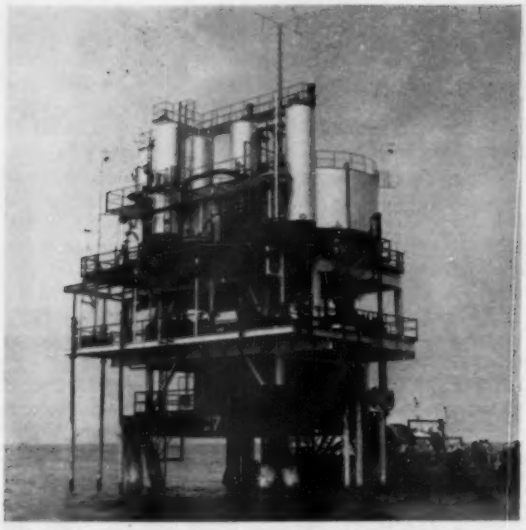
International Petroleum Co., Ltd., will spend $40,000,000 in the next 3 years developing a 138,000-acre concession in which it obtained half interest this year.

Intercol acquired the interest from Cia. Petrolera Lobitos, a subsidiary of the British firm, Lobitos Oilfields, Ltd., In addition to the expansion fund, the Standard Oil Co. (N. J.) subsidiary paid Lobitos $18,000,000.

Intercol is the operator. It also is half owner and operator for all other concessions held by Lobitos. The two companies account for more than 90 per cent of the country's output.

Interest still lags in the Sechura Desert area. But prospects brightened in eastern Peru, where 17 companies have 36,000,000 acres under concession.

The shot in the arm came when a group of three German companies brought in a 600-bbl.-daily well on a tributary of the Amazon River. Gewerkschaft Elwerath, Wintershall AG, and Deutsche Erdoel AG made the discovery in 1 Maquia, near Contanama. The find is 100 miles north of the small, 20-year-old Agua Caliente field.



VENEZUELA . . . Pump station in Lake Maracaibo, State of Zulia.

Venezuela

Venezuela is winding up one of its most historic years.

Three newcomers to Lake Maracaibo have come through with flush discoveries on their high-priced acreage. The Barinas area is now open to commercial production for the first time. The government has another 377 million dollars in its treasury, following the scramble for new concession grants.

The only dark spot is a slump in crude production that began after the June all-time high of 2,968,600 bbl. daily. The decline followed the reopening of the Suez Canal, and the later restrictions on imports into the United States.

Major discoveries . . . Sun, Atlantic, and Seaboard were the latest group to hit on Lake Maracaibo acreage acquired last year. A well completed on Block 1 has a test flow of 7,080 bbl. daily through a ¾-in. choke from 100 ft. of perforations in Eocene. Nine hundred feet of oil sand section was found in the 9,693-ft. hole.

The Signal-Pure-Hancock-Ohio Standard group a few weeks earlier tested a Block 4 discovery at 2,400 bbl. daily through a ⅝-in. choke.

Superior Oil Co. drew first blood on its wholly owned national reserve tract bordering Block 1 on the north. The first two holes tested 3,300 and 7,600 bbl. daily. The third has encountered 718 ft. of oil sand.

To the northeast of the central lake drilling by newcomers, wildcatting on old acreage by Shell and Creole has turned up a field that promises to be in the same class as Bachaquero. Creole had two wild wells in a program 18 miles south and 7 miles east of Mene Grande's last year discovery at Cueta.

West of the lake, Colon Development Co. is evaluating a discovery near the Colombian border that tested at 2,000 bbl. daily. The Shell group company made the strike on its Rosario acreage.

A discovery in Monagas by Venezuelan Petroleum Co. (Sinclair) is developing into one of the best trends found in years in eastern Venezuela. Sinclair encountered good sand sections in a test 5 miles west of 3 Aguasay, which tested 1,300 bbl. daily last year.

Mene Grande has a good well another 5 miles west on the same trend. The 1 Caro, an Atlantic and Pancoastal offset to 3 Aguasay, tests 1,554 bbl. daily through a ¼-in. choke from 13,665 ft. It tests 862 bbl. daily through a ⅛-in. choke higher in the hole.

New concessions . . . The government's 377-million-dollar take this year brought to 668 million the cash collected in bonuses and initial exploration taxes in the last 2 years. A total of 793,000 acres was awarded in exploitation and in exploration concessions in this year's round.

The big money went for exploitation rights in Lake Maracaibo and in the Gulf of Paria.

Three lake blocks totaling 74,000 acres went for 113-million dollars. An eight-company group led by Phillips with 55 per cent obtained Block 17. Phillips has 45 per cent and San Jacinto 25 per cent in a six-company combine that acquired Block 10. Sun, Seaboard, Atlantic, and Pan Venezuelan (Stanolind) won Block 12.

A four-company group, Continental Oil, The Texas Co., Cities Service, and Richfield obtained six blocks in the Gulf of Paria for 102 million dollars. The operating company, Paria Operations, Inc., is drilling its first well.

Pipelines grow . . . Socony and Sinclair put Barinas field on commercial production when they opened a 211-mile, 20-in. crude line to Puerto Cabello on the Caribbean Coast. The line initially moves 40,000 to 60,000 bbl. daily from San Silvestre and Barinas fields. Development drilling has been under way for several years.

The growing market for fuel oil prompted Shell to plan a 34-mile, 16-in. crude line from its portion of Boscan field to a new terminal at Puerto Miranda on the west side of Lake Maracaibo. The line will be able to move 75,000 bbl. daily of the 10°-gravity crude.

In the lake itself, Mene Grande is now taking out its Cueta production with a 25-mile, 16-in. line.

In eastern Venezuela, Mene Grande and Creole are opening a 97-mile, 30-in. loop to the system carrying Oficina production to Puerto la Cruz. Sinclair has in operation a new 32-mile, 8-in. line. This feeds the new Aguasay production into a 16-in. line running from Santa Barbara to Puerto la Cruz.

Middle East

Bahrain

Bahrain Petroleum Co., Ltd., raised output by several thousand barrels daily the second half of the year.

Output had held steady at 30,000 bbl. daily for several years. But gains followed the drilling of 11 development wells in the main Bahrain zone the first 6 months. Six more development wells were planned for the second half.

The year marked the twenty-fifth anniversary of the discovery of Bahrain zone, an event that was a step toward later findings in Saudi Arabia and Kuwait. But the Caltex company still has to find a major new source of crude on Bahrain itself. Its concession covers Bahrain, small nearby islands, and territorial waters controlled by the ruling shaikh.

IRAN . . . Drilling crew at work at Gach Saran, Well No. 12.

Iran

Next year will be a big one for Iran with onshore and Persian Gulf areas opening to competitive bidding, and a 140-million-dollar expansion planned by consortium companies.

The government will start taking bids after February 1 on Persian Gulf offshore areas along 285 miles of coastline. Excluded are waters extending 3 miles from shore at low tide, waters surrounding three small islands, and a block held by AGIP, an Italian Government company.

Two more districts will open for bidding on March 1. These cover vast tracts on Iran's southern coast, and include underwater areas in the Gulf of Oman

National Iranian Oil Co. can look at three types of proposals under its new law. A company can make an independent application for acreage, offering a bonus, as in the case of Venezuela. NIOC also can be a partner in a joint venture.

In the third type of arrangement, NIOC would be a minor partner. But it must have at least 30 per cent interest. Bonuses are not expected in the partnership proposals.

Standard Oil Co. (N. J.) has indicated it will bid for acreage. It plans to make an independent application with a cash bonus.

The most talked-about event this year was the grant of three concessions outside the consortium area to a subsidiary of the Italian Government's state oil agency, ENI.

Under the deal made by Enrico Mattei, head of the Italian agency, NIOC is a full, but nonpaying partner in an exploration company, Societa Italo-Iraniana dei Petroli (Sirip).

AGIP will absorb all exploration costs. Profits, if any, will be split 50-50 with NIOC, and again with the government.

AGIP will spend 22 million dollars in 12 years for exploration on its three blocks. They are located in the Persian Gulf, next to the consortium area lying east of Masid-i-Sulaiman and Naft Kel fields, and along the Mekran coast in Iran's extreme south. The Mekran acreage extends into the Gulf of Oman.

Expansion program . . . The chief projects scheduled by private companies operating Iran's producing fields will open the southernmost field to large-scale production. Gach Saran has been held down for 30 years. But growing demand for fuel oil has made the 31.8°-gravity crude valuable despite its high sulfur content. Some geologists think the field is the world's biggest.

The operating company, Iranian Oil Exploration & Producing Co., has earmarked 54 million dollars for the Gach Saran program. Projects will include a 50-mile, 26 and 28-in. crude pipeline to the Persian Gulf, a new tanker terminal in the Ganaweh area, field separation and sulfur-extraction units, and other facilities.

Other projects in the consortium area will include looping for the system moving Agha Jari crude to Bandar Mashur terminal, two more rigs for an expanded drilling program, stepped-up geological and geophysical work, and a 30-million-dollar housing and welfare program for Iranian employes.

Qum line groundwork . . . A New York investment firm, Allen & Co., has formed Elburz Oil Corp. to build a 1,000-mile, big-inch crude pipeline from the Qum area of Central Iran to Alexandretta, Turkey. The project would have the government as a partner. Its future depends on adequate reserves being developed near the Qum discovery. NIOC expects to have six rigs in the area soon.

Iraq

Iraq felt the pinch of last year's Middle East crises long after neighboring oil countries had fully recovered.

Repairs are taking time on blown-up pumping stations on the 30-32-in. crude pipeline to Banias, Syria, and the 12 and 16-in. set to Tripoli, Lebanon. Liftings from Banias resumed in March after a 4-month shutdown. By September, the system was taking most of the 393,000 bbl. daily produced from Kirkuk and smaller fields in northern Iraq.

This crude was produced by Iraq Petroleum Co., Ltd., and an affiliate, Mosul Petroleum Co., Ltd. Another affiliate, Basrah Petroleum Co., Ltd., produced 191,000 bbl. daily in southeastern Iraq. This raised Iraq's total production to three-fourths of precrisis levels.

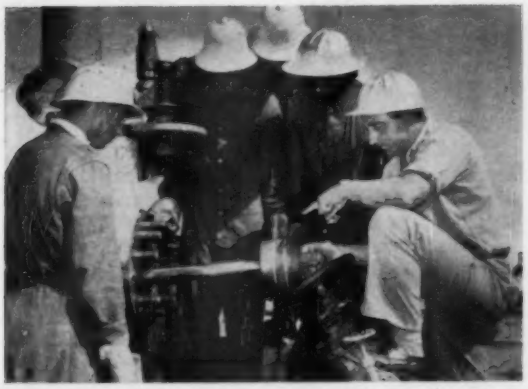
With large-scale reserves, and with many good prospecting areas, Iraq's chief problem continues to be outlets. An enlarged pipeline system through Syria seems risky in view of political conditions and last year's bad experience. Iraq, as an Arab country, appears unlikely to favor an alternative line through Turkey if Syria and other Arab nations oppose it.

Fao is Iraq's only terminal on the Persian Gulf. Deliveries through the port passed the 200,000-bbl.-daily mark for the first time in October. Big increases are expected when a planned terminal at the mouth of Shatt-al-Arab River is built.

IPC owners include Royal Dutch-Shell, British Petroleum Co., Ltd., and Cie. Francaise des Petroles, each with 23¾ per cent. Standard Oil Co. (N. J.) and Socony Mobil Oil Co., Inc., jointly own another 23¾ per cent. The Gulbenkian estate has 5 per cent.

Israel

Israeli crude production increased some this year, but the two leading companies have had unusually



KUWAIT... An important new method of training rig men is being developed by Kuwait Oil Co., about 75 per cent of whose men are locally recruited Bedouin from the desert.

high drilling costs with no new discoveries so far to back up their one field.

Lapidoth Israel Petroleum Corp., Ltd., and Israel Prospectors Corp. stepped up Heletz output to 1,200 bbl. daily. The field is now fairly well defined. The 2 Brur was completed as a producer 2 miles south of the southeasternmost Heletz field. It is on a separate pool.

Lapidoth and Israel Prospectors also brought in a gas discovery on Beeri license, 11 miles south of Heletz. Two rigs are evaluating the structure. Two more are on development at Heletz.

The companies have spent nearly $17,000,000 in joint operations. They have been the most active group in the country for several years.

Among the wildcats eating heavily into working funds were the 1 and 2 Sdom. The first test drilled for 15 months before abandonment. The second has been drilling more than 6 months late in the year. A deep test on Heletz structure is going slowly, as is 1 Tsinifim.

Aside from contract work for Lapidoth and Israel Prospectors, two other companies are drilling at present. Judea Oil Co. is drilling in the Jerusalem corridor. Naphtha Israel Oil Co. has a test south of Beersheba.

Kuwait

Two developments this year furthered the shaikhdom's role as the wonder of the oil world.

Expansion began at Mina-al-Ahmadi tanker terminal, already the world's largest. The program calls for a new oil jetty on the north side of the present terminal. Work will be completed in mid-1959.

Present facilities were enlarged to handle 1,500,000 bbl. daily, up from more than 1,200,000 bbl. daily. Two new offshore loading berths were added, served by 24-in. crude lines.

The other development was confirmation by Kuwait Oil Co., Ltd., of a major field 60 miles north of Burgan fie'd. The new field is more than 20 miles long. It lies near the Iraq border. Initial wells in the area were 1 and 2 Raudhatain, 2 Bahrah, and 1 Sabriya.

Output from Burgan and Magwa-Ahmadi fields, where tens of billions of proved reserves lie a few miles from dockside, reached a record high of 1,370,000 bbl. daily in June. This was a quick recovery after the Suez Canal reopened.

Since then, Kuwait Oil has remained the biggest Middle East and the world's fourth largest producer by averaging well over 1,200,000 bbl. daily. The company holds the concession for British Petroleum Co., Ltd., and Gulf Oil Corp.

Five rigs normally are running in the shaikhdom. Three are in Burgan, one in Magwa-Ahmadi, and one in the Raudhatain area. Twenty-three development wells were drilled the first half. Twenty-seven development and three wildcats were scheduled for the second 6 months.

Neutral Zone

Several American independents are getting more than just a dribble of Middle East production for the first time as the result of a five-rig drilling-development program.

Output was at 78,000 bbl. daily late this year, with 100,000-bbl.-daily output expected soon. In the program behind these gains, 26 of 28 development wells were completed as producers the first half. Twenty-nine more field wells were planned the last 6 months. No wildcats are being drilled.

Getty Oil Co. has the right to half the production as holder of the concession over Saudi Arabia's undivided half interest in the zone. Ten other American independents have an interest in remaining production through ownership of American Independent Oil Co. Aminoil holds the concession over Kuwait's undivided half interest.

The owners with the largest interest in Aminoil are Phillips Petroleum Co., 33.54 per cent; Hancock Oil Co. and Signal Oil & Gas Co., 15.08 per cent each; and Ashland Oil & Refining Co., 12.7 per cent.

Qatar

Qatar output rose steadily this year, passing the 150,000-bbl.-daily mark for the first time in July.

The gains were due to market demands for the specialty, light crude produced at Dukhan field. Qatar Petroleum Co., Ltd., has no immediate programs for a production stepup or new terminal facilities. The Iraq Petroleum Co., Ltd., affiliate can handle an average of 170,000 bbl. daily with present facilities. Its concession covers the land area of the shaiksdom and territorial waters to the 3-mile limit.

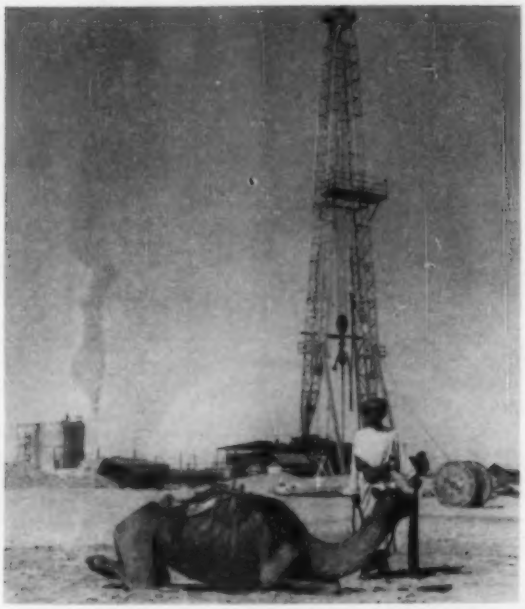
Shell Co. of Qatar has a concession over territorial waters outside the 3-mile line. The company early this year placed an order for a mobile drilling barge. It will replace a barge wrecked a year ago while under tow to its third drilling location. The new unit will be ready in about 2 years.

Saudi Arabia

Arabian American Oil Co. is steadily enlarging offtake facilities, and is successfully adding to proved and possible crude reserves.

Safaniya, the first offshore field in the Middle East, opened in April. A 140-mile, 22-in. crude line initially moved 50,000 bbl. daily south to Ras Tanura. Because of demand for crude with high heavy fuel oil yields, Aramco expects to move 175,000 bbl. daily through the line by mid-1958.

Expansion also is under way on the 1,067-mile trans-Arabian pipeline system to the Mediterranean Coast. Capacity will be stepped up to 435,000 bbl.



SOUTHERN ARABIA... Cities Service discovery well in the province of Dhofar in the Sultanate of Muscat and Oman.

daily, chiefly by installing 5,000-hp. combustion-gas turbines. These burn crude tapped from the line. The units are being installed on both the Aramco and Trans-Arabian Pipe Co. sections. Tapline operates the final 574-mile length extending to Sidon, Lebanon.

TECHNICAL ARTICLE ON SAUDI ARABIA

A detailed and informative article appeared in the July 15, 1957, issue of The Oil and Gas Journal, pp. 84-91, and July 22, 1957, pp. 91-96, entitled "Basic Pattern of Exploration in Saudi Arabia." Authors are Warren H. Thralls and R. C. Hasson, Arabian American Oil Co. The article details the petroleum geology, fields and reservoir conditions, drilling and production data.

An Aramco wildcat brought in a discovery 75 miles west of Ghawar trend in October. The 1 Khurais tested 3,000 bbl. daily of 31°-gravity sour crude from 4,755 to 4,898 ft. It is located in a sand-dune belt just east of Saudi Arabia's central plateau. The pay was "D" member of the Arab zone, the most productive horizon in the country.

Ghawar itself was extended 12 miles northward when 56 Ain Dar was brought in as a producer. It was completed in the "D" member at 7,120 ft. Total depth was 7,325 ft. The north-south trend was already 140 miles long.

A second Persian Gulf structure is under test. It is Manifa, located 9 miles from shore, halfway between Safaniya and last year's discovery at Khursaniyah.

Six development wells and one water-injection well were completed the first half. One wildcat was completed as an observation well. Three development, three water-injection, and five wildcat wells were planned for the second half.

A Japanese mission visited the kingdom to study the possibility of obtaining a concession. Nothing had jelled by late this year.

Southern Arabia

Cities Service Oil Co. and Richfield Oil Corp. turned a page of geological history when they announced a discovery on their 32,000-sq.-mile concession over Dhofar.

Their operating company, Dhofar Cities Service Petroleum Corp., tested the 1 and 2 Marmul wells at 2,000 bbl. daily each. The nearest Saudi Arabian production is 500 miles away.

The 11 by 5-mile structure lies 35 miles from the coast. It produces from about 3,200 ft. A light rig is developing the structure. A heavier rig is testing other structures defined on the concession.

Except for Dhofar and Yemen, the rest of southern Arabia is under concession to affiliates of Iraq Petroleum Co., Ltd. These areas include Aden Protectorate, Muscat and Oman, and the Trucial Coast. All are protected by the British.

An Oman wildcat, 1 Fahud, was abandoned as a dry hole at 12,000 ft. The 1 Shuweihat on the Trucial Coast also was drilling this year.

Drilling will begin soon in the Persian Gulf off the Trucial Coast. Abu Dhabi Marine Areas, Ltd., will use a mobile barge towed from a West German shipyard. The company holds a 12,000-sq.-mile offshore concession for British Petroleum Co., Ltd., and Cie. Francaise des Petroles. The first test will be 20 miles off the island of Das in 50 ft. of water.

In Yemen, unsettled political conditions caused Yemen Development Corp., an American firm, to postpone exploration work. Deilmann Montan Gmbh. stopped work earlier over the question of whether the Yemen Development grant conflicted in some areas with its own rights.

Syria-Lebanon-Jordan

Syria, Lebanon, and Jordan are have-nots in the Middle East, but they are important as transit countries for pipelines and they hope to some day have commercial production.

Trans-Arabian Pipe Line Co. transports about 350,000 bbl. daily through all three countries en route to Sidon, Lebanon. Iraq Petroleum Co., Ltd., normally sends more than 500,000 bbl. daily through Syria. Some of the crude goes to Banias, Syria. The rest goes through Lebanon to a terminal at Tripoli.

J. W. MenHall, an American independent, has brought in two wells on a concession in Northeast Syria. Atlantic Refining Co. has an interest. An affiliate of a West German firm, Deutsche Erdoel, AG, holds another concession in the same area.

In Jordan, E. W. Pauley is drilling below 5,000 ft. in the first well ever spudded in the country. The American independent started the test 30 miles east of Amman after obtaining a concession over one-third of the country. Jorge Zimeri, Guatemalan financier whose family lives in Bethlehem, obtained another one-third. J. W. Sparks, Texas independent and drilling contractor, will work the area.

No work is under way in Lebanon. Lebanon Exploration & Drilling Co., registered in London, holds licenses.

Europe

Austria

Austrian crude production is declining, and little hope is held for an immediate pickup.

Output slipped below 60,000 bbl. daily by mid-year. The Austrian Institute for Economic Research predicts a further decline on the order of 5 per cent per year for a decade.

The chief drop is at Matzen-Auersthal field in Vienna basin. The field is the largest in Europe, and accounts for 81 per cent of Austrian output.

Austria is further burdened by crude-oil reparation shipments to Russia. Delivery of 20,000 bbl. daily free of charge will continue another 8 years.

On the brighter side, NIOGAS, a state-owned company, let contracts for a 6, 8, 10, and 12-in. pipeline system. The lines will deliver natural gas from Fischamend field to Vienna and other cities.

Three western companies are continuing small-scale activities. Royal Dutch-Shell and Socony Mobil Oil Co., Inc., have output through Rohoelgewinnungs, AG. R. K. Van Sickle, a Canadian operator, produces 600 bbl. daily from Neusidl a. Zaya field.

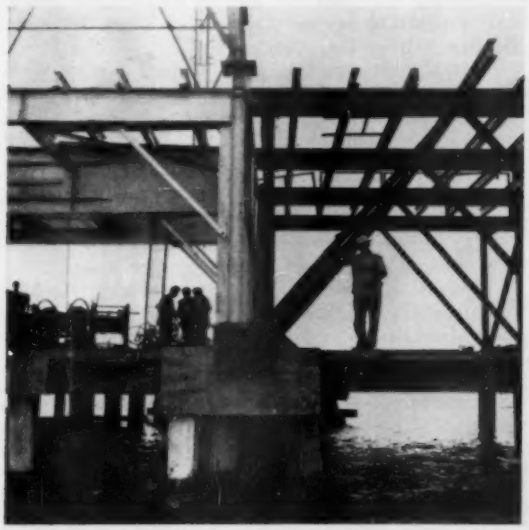
Denmark

Standard Oil Co. (N. J.) will drill a test on its new Danish concession this spring. The company took over the 50-year exploration and development concession of Gulf Oil Corp. by acquiring the stock in Danish American Prospecting Co. The rights have another 30 years to run.

France

Exp'oration work continues without letup, but there were no new major discoveries by late this year.

The most intensive play centers in the Aquitaine basin, where more than two dozen wildcats per year are drilled. The 35,000-sq.-mile area in southwestern France holds both Parentis oil field and Lacq natural-gas field. Both are among the most valuable producing properties in Europe.



FRANCE... Rigging-up operations at a platform job in Lake Biscarrosse. Floor is at left and pipe racks at right.

Two wells further brightened the basin's prospects this year by encountering gas or oil in new formations. Esso-Rep found wet gas in Lower Jurassic in a deep-pool test under Parentis field. The 101 well blew out at 12,300 ft. Present Parentis output of 25,000 bbl. daily comes from limestone and dolomite.

The Standard Oil Co. (N. J.) affiliate has found several one-well fields in the Parentis vicinity without finding anything comparable. The French Government and Gulf Oil Corp. have an interest in the company.

The other new horizon yielding oil for the first time was Upper Cretaceous sandstone. Ste. Nationale des Petroles d'Aquitaine (SNPA) recovered 9 bbl. of crude and 5 bbl. of water on a drill-stem test between 6,260 and 6,365 ft. in 2 Clermont, near Dax.

SNPA opened Lacq natural-gas field to commercial production this year. A desulfurization plant processes 35,000 M.c.f. daily of the sour gas. It feeds 23,000 M.c.f. daily into a pipeline system serving towns and industries in the region.

Initial work began on a 1,000-mile pipeline system that will deliver gas to Chateauroux, Nantes, Lyon, and Paris. The 12, 14, 16, and 24-in. system will be fully operating in 2 to 3 years. Lacq reserves may be as much as 14 trillion cubic feet.

Exploration also is under way in the Paris basin. American Overseas Petroleum (France), a Caltex company, spudded its first test in the basin near Senelly, about 25 miles southeast of Orleans. It is working on a 12,000-sq.-mile license jointly with Ste. Nationale des Petroles du Languedoc Mediterranean (SNPLM).

Work is continuing in the series of small basins in eastern France, extending from the German border to the Mediterranean. Fields in these areas account for all production other than in Aquitaine.

Italy

Oil development on the Italian mainland still is playing second fiddle to Sicily.

The Mediterranean island, with a more favorable oil law, now supplies most Italian crude production, and will account for a greater share in the near future.

Sicilian output rose to an average of nearly 30,000 bbl. daily this year, due to the opening of a 40-mile, 14-in. crude line from Gulf Oil Corp.'s Ragusa field to the RASIOM refinery at Augusta. Ragusa output next year will average 39,800 bbl. daily from 22 wells.

Ente Nazionale Idrocarburi, the government oil agency on the mainland, has a field at Gela, 25 miles northwest of Ragusa. The first well produced 1,070 bbl. daily on pump. Several more wells are drilling.

A British Petroleum Co., Ltd., subsidiary started its second well on the island. It was staked near Caltagirone, northwest of Ragusa. BP's discovery of extremely low-gravity crude at Vittoria 3 years ago has never gone on commercial production.

The Regional Council of Mines subdivided open acreage on the island into 55 blocks. Of the 1,300,000 acres, about 450,000 acres were reportedly earmarked for ENI. Awards had not been made late this year.

Gulf pulled out of the mainland entirely because of the new oil law. The legislation gives the government the big half in production royalties. Gulf also regarded additional local and national taxes as discriminatory.

Gulf's former partner on the mainland, Montecatini, is going ahead with development of Cigno field on the Adriatic east of Rome. The Cigno 7 reportedly found a new zone at 2,624 ft., 300 ft. deeper than the 1955 discovery well.

The well was 1,600 ft. from two offsets being drilled by AGIP-Mineraria, an ENI subsidiary. The first two wells drilled by Gulf were troubled by water encroachment.

ENI continued to develop the natural-gas industry in the Po Valley, where it holds a monopoly. The industry is the most highly developed in Europe.

ENI, headed by Enrico Mattei, secured three concession blocks in Iran in a joint venture with the Iranian Government. Under the terms, ENI would receive the thin end of a 25-75 profit split. The budget alloted for development was comparatively small.

ENI also has an interest in Egyptian production through control of International Egyptian Oil Co. This company has 49 per cent interest in Oriental Oil Co., which has production in Sinai fields. The government has the remaining interest.

Wintershall AG, a West German firm, obtained controlling interest in a 3,500-sq.-mile concession in western Sardinia. It will work jointly with the local government. Geophysical work will begin next year or in 1959.

Netherlands

A successful exploration program in The Hague-Rotterdam area is enabling Nederlandse Aardolie Mij. to produce more than 31,000 bbl. daily in the Netherlands.

The jointly owned Royal Dutch-Shell-Standard Oil Co. (N.J.) company gets about one-fifth of its output from a series of small pools discovered in the area. The finds have been made every few months, including three this year. Because of the favorable results, NAM this year increased its concession area in the vicinity to 496,000 acres.

The mainstay of Dutch production is Schoonebeek field in West-Central Holland, which produces on pump from 2,500 ft.

Portugal

Mobil Exploration Portugal, Inc., has a one-rig drilling program under way in Portugal. The Socony Mobil Oil Co., Inc., subsidiary is working under an exploration contract signed 3 years ago with Cia. dos Petroleos de Portugal, owned by the government and Axel Johnson interests of Stockholm.

Spain

If Spain's oil law is liberalized, a move reportedly under consideration, chances are that exploration play will pick up rapidly.

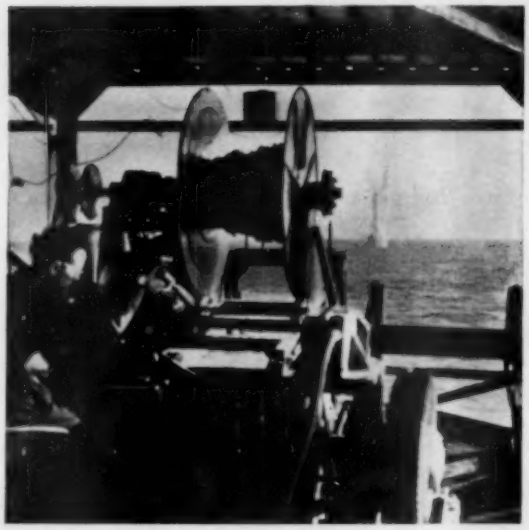
Several noncommercial gas shows and promising structures are teasing companies already in the country. This is despite present laws limiting foreign firms to a minority interest working under contract with Spanish companies, either government or private.

Valdebro, composed of an American syndicate and the National Institute of Industry, expected to spud its fourth wildcat in mid-November. The well is testing a seismic structure in northern Spain.

The syndicate, organized by General American Oil Co. of Texas in 1952, expects to test several more structures before its contract expires in 1959. DeGolyer & MacNaughton is another leading owner in the group.

A West German firm, Deilmann Montan. Gmbh., had two wells drilling in a joint venture with Cia. de Investigacion y Explotacion Petroliferas, S.A. (CIEPSA). The tests are near Vitoria and Trevino in north-central Spain.

Other companies working in the country include the government marketing monopoly, CAMPSA, and Petrolifera Iberica, a domestic company with German advisors. The National Institute, besides its Valdebro venture, is working with a subsidiary of the Italian Government agency, ENI.



UNITED KINGDOM . . . Marine survey off the coast consisted of exploding charges of 17 lb. of high-explosive 4½ ft. below surface of water along a previously plotted line.

United Kingdom

Chances are good for modest additions to small-scale production despite three out of three dry holes the first half of the year.

British Petroleum Co., Ltd., planned 4 more wildcats in the last half of the year, along with 17 development wells. Out of 27 development holes, 12 were completed as producers the first half. Work is centered in the Midlands, where output is now 1,700 bbl. daily.

Turkey

Exploration play is unfolding rapidly in the wake of wide-scale concession awards 2 years ago.

Several wildcats already are drilling. Turkish American Oil Co. was the first to get a well under w.v. More than a year ago it started a slant-hole test on an anticline extending under Iskenderun Gulf on a farmout from Gilliland Oil Co. of Los Angeles.

American Overseas Petroleum, Ltd., has started its second test on Kahta Cayi structure in the semiarid Gaziantep region. The Caltex affiliate abandoned its first test 70 miles to the southwest at 10,153 ft. Tidewater Oil Co. is drilling near Mardin, northwest of Iraq's northern fields. Tidewater, Atlantic Refining Co., and Seaboard Oil Co. jointly hold 3,000,000 acres.

Esso Standard (Turkey), Inc., is drilling in Thrace, European Turkey. The Ceylan 1 is 8 miles west-northwest of Istanbul. A Royal Dutch-Shell company spudded a well this fall 100 miles northwest of Istanbul. It is scheduled to go to 10,000 to 12,000 ft.

A dozen companies have concessions in the seven of nine zones open in Turkey, aside from the government-controlled Turkish Petroleum Corp., Besides Esso and Shell, other companies in Thrace are Amoseas, Deilmann Montan, Gmbh., Istanbul Tabbi Gas, Marmara Petroleum, and Tidewater.

Along with Gilliland, Amoseas, and Tidewater, companies in Asian Turkey are Bolsa Chica Oil Corp., D. D. Feldman Oil & Gas, Esso, Istanbul Tabbi, Mobil Exploration Mediterranean, and Shell.

Crude produced by the government from Raman and Garzan fields is marketed locally. Output averages 6,300 bbl. daily on pump. Three development wells were completed the first half as producers. One of three wildcats was successful. Three more development and three more wildcats were scheduled for the last 6 month. New fields in the same district are Resan, Kentalan, and Germik.

West Germany

West Germany, like the United States, is turning to deeper drilling in search of more reserves.

The country is well in front as the leading crude producer in Western Europe. But with output due to pass 80,000 bbl. daily, there has been little addition to total supplies.

The deep play is part of an intensive exploration effect by domestic companies and subsidiaries of international majors. Nearly 70 geophysical crews currently are covering the country. Forty of them are seismic parties. Drilling footage is nearing 2,000,000 ft. per month.

The deepest holes are going down in northwestern Germany. The objective is to penetrate the huge Zechstein salt formations. There is some hope that the Zechstein itself might yield prolific gas reserves.

A joint Standard Oil Co. (N.J.)-Royal Dutch-Shell company has the deepest well. Gewerschaft Brigitta is drilling ahead at 13,992 ft. in 3 Cismar, near the Baltic Sea. Gewerkschaft Elwerath recently abandoned 1 Eldingen Z at 13,259 ft. as a dry hole.

WEST GERMANY . . . Pumping well in Heide oil field, Holstein province.

The year's best find was deeper than any previous commercial production. Wintershall AG found gas in Zechstein formation at 10,300 ft. The 1 Dueste Z was a deep test in Aldorf field in Weser-Ems district. The well's potential is expected to match output from wells in nearby Rehden field, the best in the country.

Three other gas fields and six oil fields discovered by late this year were comparatively small.

The area between the Weser and Ems rivers is growing in importance. It now accounts for about one-third of the country's reserves. Most output comes from numerous small fields in Hanover and Emsland provinces.

Russia—Eastern Europe

There is little doubt that the production goal of 1,940,000 bbl. daily for the year was within reach of the Soviets.

Development is steadily going forward in the vast area between the Volga River and Ural Mountains, nicknamed the Second Baku. This region together with the closely linked Emba Basin, north of the Caspian Sea, now accounts for two-thirds of total crude output.

There also are signs that the old Baku region itself may be further from depletion than previously believed. The famous old fields on Apsheron Peninsula are on the way out. But the Russians say offshore prospects are good all the way down the Caspian Coast to the Iranian border. There also is hope of developing reserves below 9,800 ft. in old fields.

Output from Caspian wells off Apsheron is rapidly approaching 100,000 bbl. daily, out of 300,000 bbl. daily in the region. About 8 per cent of total output comes from other Caucasus areas and from the Ukraine. A similar amount comes from Asiatic Russia, including Sakhalin Island.

Natural-gas output also is gaining. Production averaged 1.8 billion cubic feet daily the first half. It was due to rise to 2.4 billion cubic feet daily the second 6 months.

The Soviets also are pressing pipeline construction. The now-abandoned 5-year plan called for 9,000 miles of trunklines during the period. Five thousand miles were in existence in 1955.

Internal demand appears to be matching production closely. For this reason observers generally feel that exports could not rise far above present levels for at least several years. They now average about 120,000 bbl. daily. This could change for political reasons, or if the Russians chose to trade oil for increased imports.

Romania . . . The bulk of Romanian crude production is coming from regions closed to private companies in pre-World War II days.

Newly developed areas include Moldava, Oltenia, Transylvania, the Pitesti region, and Vedea district. Skidding output in the old Prahova district is below 60,000 bbl. daily. This small area, 30 miles north of Bucharest, produced most of the country's 170,000 bbl. daily in the peak period of the 1930's.

Output, now about 220,000 bbl. daily, is gaining at a much slower rate that in the immediate postwar years. But the Communist Government forecasts 270,000 bbl. daily in 1960.

Romania exports about 30,000 bbl. daily to non-Communist countries. Its program is tied closely to Russia's.

Other satellities . . . Current crude output from Hungary, East Germany, Czechoslovakia, Albania, and Bulgaria probably totals around 38,000 bbl. daily.

Hungarian output is down to 19,000 bbl. daily or less, compared with 35,500 bbl. daily 2 years ago. The decline is due to rapid water encroachment of Nagylengyel field, which produces three-fourths of the country's crude.

Albanian output has risen to around 6,700 bbl. daily. Bulgarian output is up to 4,500 bbl. daily from the northeastern part of the country. Polish and Czechoslovak output is steady around 3,700 bbl. daily. East German production amounts to a few hundred barrels daily.

Yugoslavia

Further small gains were made this year with output averaging 7,700 bbl. daily in some months. Most of the increase comes from Croatian fields. Small output also is under development in Serbia. Slovenia production is declining.

Australia and Asia

Australia

Several companies are continuing their efforts to find commercial production in Australia, but work is not as intensive as a few years ago when a flash-in-the-pan discovery at Rough Range electrified the country in 1953.

West Australian Petroleum Pty., Ltd., (WAPET) is still the most active company. It is concentrating its survey and core-drilling work in the Exmouth Gulf area, and in Canning and Fitzroy basins of West Australia.

WAPET, owned 80 per cent by Caltex and 20 per cent by a local firm, Ampol, made the Rough Range discovery. The company undertook its shallow-hole program after a series of deep, dry holes following the first find.

Companies controlled by British Petroleum Co. Ltd., Standard-Vacuum Oil Co., and Australian interests are the next most active on the subcontinent. They are Frome-Broken Hill Pty., Ltd., and Frome-Lakes Entrance Pty., Ltd. Frome-Broken Hill and two other local companies currently have a joint test under way at Wyaaba, in the Gulf of Carpentaria area on northern Australia.

New Zeland . . . British Petroleum Co., Ltd., Royal Dutch-Shell, and Todd Bros., a local company, are carrying on preliminary work in a joint venture on North Island.

British Borneo

Two sister companies of Brunei Shell Petroleum Co., Ltd., expect to start offshore wells early next year.

Sarawak Oilfields, Ltd., will spud a test at Siwa, 8 miles offshore and 18 miles from its small, declining Miri field. Shell Co. of North Borneo will drill from a platform 30 miles north of Labuan.

The two companies are working in the colonies on either side of Brunei, where an offshore program is maintaining output from the biggest field in the British Commonwealth.

Brunei Shell produces about 115,000 bbl. daily from Seria, with an increasing amount of the crude coming from offshore. Its latest seaward move was the launching this year of a shallow-water drilling platform. The outfit will drill a dozen wells about a mile out.

The company has given up its Ampa Patches test. The well was drilled 30 miles out in the South China Sea. It was abandoned at 6,000 ft. after months of tough drilling and no shows.

Seria field is defined on the land side. The company turned to offshore development after years of poor exploration results on land.

Burma

Burmah Oil Co. (1954), Ltd., is producing 9,200 bbl. daily as the result of opening of the rebuilt Syriam refinery.

The plant handles increased output from Chauk-Lanya field. This and other small production in the country is used locally.

Burma still shows the scars of World War II and the unsettled political times that followed. The first wildcatting program since the war is under way at Ondwe in Central Burma. But government troops still are kept on hand to maintain security.

A year-long seismic survey in the Irrawaddy Delta also has been completed.

Burmah Oil (1954) is one-third owned by the Burmese Government. Burmah Oil Co., Ltd., owns most of the remainder. Two other British companies have small interests.

Formosa

Chinese Petroleum Corp. is carrying on a small-scale exploration program in southern and in northeastern Formosa. Token production from old fields is down to around 65 bbl. daily.

India

Route surveys are being made for a 20-in. trunk pipeline that would open Nahorkatiya field to major commercial production.

Plans call for a 600-mile line from the Upper Assam producing area to Barauni, where the government tentatively proposes a 40,000-bbl.-daily refinery. A 250-mile extension to Calcutta might be added later.

Assam Oil Co. is pushing development of Nahorkatiya. Eighteen or more oil wells and at least two gas wells are already completed as producers. The Burmah Oil Co., Ltd., subsidiary also is drilling on nearby Hugrijan and Moran licenses.

A new producing and a new refining company will be set up to handle operations. Burmah Oil and the government will be partners. Arrangements largely are agreed on. Burmah Oil will hold two-thirds interests in the producing company and one-third interest in the refining firm. The government will hold one-third interest in production, two-thirds in refining.

Estimates are that the field can produce 50,000 bbl. daily of crude and 45,000 M.c.f. daily of gas for 20 years.

Standard-Vacuum Oil Co. is drilling its third test on a 10,000-sq.-mile concession in Bengal basin. The

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CB&I reactor and stripper being removed for loading on SS President Harrison of American President Lines. Reactor is 13 feet 8 inches in diameter, stripper is 6 feet 8 inches in diameter.

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Jalangi 1 is about 100 miles due north of Calcutta, and 72 miles northeast of the first test at Burdwan. The Burdwan wildcat was abandoned at 8,921 ft. The second well, 1 Galsi was drilled 35 miles northwest of Burdwan. It was abandoned at 4,250 ft.

A Romanian crew is drilling a well in a government-sponsored search in Kangra Valley of Punjab. The zone is one of three reserved by the government. The other is at Cambay on India's West Coast, and one is near Assam Oil acreage.

Indonesia

Indonesian crude production is rising rapidly, but the future will be cloudy as long as the government drags its feet on new concession awards.

Output is now over 350,000 bbl. daily. It will rise further as Caltex completes more of its big development program in Central Sumatra. Standard-Vacuum Oil Co. opened Lirik field last month. Royal-Shell has a shut-in field in Borneo awaiting an outlet.

The Caltex expansion program is by far the largest. Current output of more than 190,000 bbl. daily is nearly double the level of a year ago. The increase came from Minas field, where Caltex this year opened a 16-mile, 18-in. loop to the 12-in. line carrying output to Perawang terminal on the Siak River. The company doubled the number of river tankers carrying the oil 93 miles downstream to Pakning ocean terminal.

Caltex also is fully developing Bekasap and Duri fields, 40 miles northwest of Minas. A 30-in. crude outlet will carry the output to a new ocean terminal at Dumai. Minas output will be tied into this line later.

Stanvac's new 88-mile, 8-in. crude-oil line from Lirik field to a Siak River terminal at Buatan can move 20,000 bbl. daily. The line is heated in order to keep the high-pour-point crude fluid. From the Buatan terminal, crude is moved by river tankers to Sungei Gerong refinery.

Lirik output is reversing a gradual decline in Stanvac production. In the months before the new line opened, output had dropped below 60,000 bbl. daily.

Shell output from fields in Sumatra, Borneo, Ceram, and Java has dipped slightly. It is below 100,000 bbl. daily. But an upswing is due when a pipeline opens from Tandjung field in Borneo. N.V. de Bataafsche Petroleum Mij. has 23 shut-in wells in the field, and drilling is continuing.

Warnings by all three operating companies that more concessions are needed came to a head this month. Stanvac suspended all exploration operations in Sumatra because of a lack of fresh territory. It is moving its geological and geophysical crews to India and Pakistan.

The young government, formed in the post-war years, has never granted new concessions. It also has refused to return to Shell its properties in northern Sumatra, where some of the company's best fields were located. There is no production in this area except for local, makeshift use.

Japan

Teikoku Oil Co., Ltd., is maintaining with little change output of about 6,100 bbl. daily from Japan's old, shallow fields. It is looking for deeper reserves with one heavy rig, capable of 12,000 ft. It also has 25 per cent interest in Japanese Petroleum Exploration Co., which is working in nonproductive areas. The government has half interest in Japanese Petroleum. Refining interests own the remaining 25 per cent.

NEW GUINEA... Materials are being brought to location by helicopter in a jungle clearing.

New Guinea

Big helicopters are cutting down the rigging-up time for wildcats in New Guinea's thick jungle areas.

Australasian Petroleum Co., Ltd., and Island Exploration Co., Ltd., set up two 10,000-ft. rigs within weeks after locations were staked in Papua, the British-held part of New Guinea. Before the coming of the "helirig" operation, as much as 17 months was needed to cut a roadway.

The wells are 1 Komewu, 50 miles west of Omati and 80 miles from the coast, and 1 Sireur, 18 miles east of Komewu. British Petroleum Co., Ltd., and Standard-Vacuum Oil Co. have the major stake in the venture through Australasian Petroleum Co., Ltd. An Australian firm, Island Exploration Co., Ltd., has a minority interest.

The three small fields in Netherlands New Guinea declined to 5,900 bbl. daily this year. But Dutch New Guinea Petroleum Co. has a concession area enlarged to 63 million acres. Its owners are Royal Dutch-Shell, 40 per cent; Stanvac, 40 per cent; and Caltex, 20 per cent.

Pakistan

The tempo of exploration play is almost a sure bet to keep on gaining.

Companies working under favorable laws are finding numerous traces of gas in widely scattered wildcats. Small crude production is established in the northern part of West Pakistan. Most encouraging of all, Sui gas field in West Pakistan's big basin is one of the world's largest.

Pakistan Petroleum Co., Ltd., discovered Sui in 1952, had disappointing results in wildcatting the first half of the year. Three wells were abandoned, Karachi 1 at 9,417 ft., Khairpur 2 at 11,670 ft., and Adhi 1 at 2,098 ft.

As consolation, the company brought in the first development well in Sylhet gas field in East Pakistan. Sylhet 3 was completed as a producer at 4,870 ft. A preliminary survey is complete for a 145-mile pipeline

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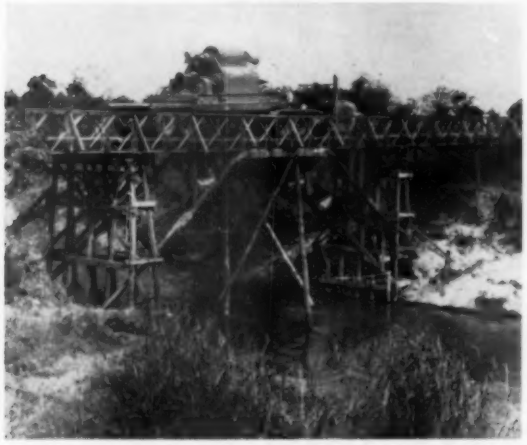

PHILIPPINE ISLANDS... Draw works of a heavy rig being hauled across rural bridge suggests transportation problem Stanvac had in its Cagayan Valley exploration venture.

to Dacca. A third gas field at Uch, in West Pakistan, is not being developed at the present time because of a high percentage of carbon dioxide, and because of huge reserves in nearby Sui.

The Burmah Oil Co., Ltd., subsidiary is due to have three more tests under way by the end of the year. The 1 Lalmai will be located near Comilla, East Pakistan. The 1 Bannh will be located in Kalat, West Pakistan.

The 2 Adhi will be the third test in 5 years of a structure in Rawalpindi, West Pakistan. It will be drilled jointly with Pakistan Oilfields, Ltd., an Attock Oil Co. subsidiary.

The Pakistan public and government hold 30 per cent interest in Pakistan Petroleum and Attock Oil. An interest also is held in the various other exploration programs in the country.

Hunt International Oil Co. has drilled three wildcats on licenses covering 20,000 sq. miles in West Pakistan. The latest test at Sari Sing was bottomed at 10,166 ft. Slight shows of hydrocarbons were encountered, but no oil. Dhak 1 was abandoned at 8,404 ft., and Dhak 2 at 14,614 ft. after fishing jobs.

Hunt has one seismic and two gravity parties in the country. Future wells are planned along Makran Coast and in Sind.

Standard-Vacuum Co. has two rigs working on a 10,000-sq. mile concession in West Pakistan. Mirpur Batoro 1 is drilling below 1,068 ft. 75 miles east of Karachi. Mari 2 is drilling ahead at 7,771 ft. Stanvac also has a 10,000-sq. mile block in East Pakistan.

A Royal Dutch-Shell subsidiary will spud its first deep test by March. The company has licenses on 10,000-sq.-mile blocks in each wing of the country. Seven-eighths of the East Pakistan area is offshore.

Sun Oil Co. is the latest company to enter the country. A subsidiary obtained rights this year on five blocks in south and southwest West Pakistan. The area totals 10,000 sq. miles.

Philippines

Standard-Vacuum Oil Co. plans to rig up for its second test in the Cagayan Valley after completing seismic work it now has under way.

The company's 1 Faire, abandoned this year at 10,324 ft., was the second well drilled in the valley. The first was 1 Tumauini, abandoned at 10,414 ft. last year by Philippine Oil Development Co. (PODCO).

PODCO late this year was below 10,490 ft. in 2 Tumauini. The well is on acreage on which Caltex has a cross-option interest.

Other companies holding concessions are San Jose Oil Co., Inc., Luzon Stevedoring Co., Acoje Mining Co., and Philex Mining Corp.

Africa

Algeria

American companies stand a good chance of getting into exploration play next year when the French Bureau de Recherche awards rights on 23,000 sq. miles in the central Sahara.

Three big American independents are in the running with bids made jointly with French interests. Sinclair Oil Co. has 27 per cent, and Newmont Mining Co. 18 per cent in an offer by a five-company group. Cities Service Co. has 50 per cent of a three-company bid. Phillips Petroleum Co. is making an offer with a group that includes backing from the old Suez Canal Co. Canadian Delhi Petroleum, Ltd., headed by Clint W. Murchison, also is seeking acreage. It has 50 per cent in a bid made with two French companies.

Other bidders include subsidiaries of British Petroleum Co., Ltd., and Petrofina, Cie. de Recherche et d'Exploitation de Petrole au Sahara (CREPS), in which Royal Dutch-Shell has 35 per cent interest, and domestic French companies.

Notable by their absence were American majors and other big independents. They shied away because of the required 50 per cent French participation, a comparatively small open area, and unsettled political conditions.

The French hope to open by the end of this year a 100-mile, 6-in. crude pipeline from Hassi Messaoud to Touggourt rail terminal. The line is being built under a crash program costing $3,000,000. The immediate goal is to move 4,000 bbl. daily via the line and railroad to the Mediterranean. The rail leg of the system is expected to be the most troublesome. The 340-mile rail haul will limit deliveries and will be vulnerable to rebel attack.

CREPS has on order 16-in. pipe for a crude-oil line from Edjele field to the Mediterranean. The company is talking with both the Libyan and Tunisian governments on rights-of-way. The line would probably be routed through the country offering the best political terms.

Egypt

Fresh crude output this year reversed a 4-year downhill trend, reaching an all-time high of more than 50,000 bbl. daily as early as July.

The increases came from fields in a concession block on the Red Sea Coast of Sinai. Belayim is the largest, at 18,500 bbl. daily. Feiran produces about 400 bbl. daily. Rudeis opened to commercial production in August at 1,800 bbl. daily from two wells.

Standard Oil Co. (N.J.) had originally held the block. It gave it up in 1949 due to unfavorable legislation. Ownership since then had fluctuated until this year when a final arrangement apparently was reached.

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Oriental Oil Co. was formed to hold the fields. International Egyptian Oil Co. holds 51 per cent. The government has 49 per cent. International Egyptian is owned by Petrofina, Swiss bankers, and the Italian Government agency, ENI, the largest owner and operator.

Two owner companies of an older producing firm now are missing from the scene. British Petroleum Co., Ltd. and Royal Dutch-Shell each own 31 per cent of Anglo-Egyptian Oilfields, Ltd. These interests were sequestered last year by Egypt after the invasion. The government had held the remaining interest in the company to begin with.

Producing properties concerned include two wholly owned fields on the mainland side of the Red Sea. These are Ras Gharib, the largest producer in Egypt, and Hurghada. Three fields on Sinai are held jointly with Socony Mobil Oil Co., Inc., Ras Sudr, Asl, and Ras Matarma. All five have gradually declined.

Sahara Petroleum Co. is drilling ahead at 5,360 ft. in its seventh test in the Western Desert.

Libya

A deep test in Tripolitania will be one of the highlights of next year's Libyan exploration play.

Oasis Oil Co. of Libya will spud the wildcat in north-central Libya, about 75 miles south of the Gulf of Sirte. The well could go as deep as 15,000 ft.

Oasis is owned by Ohio Oil Co., Continental Oil Co., and Amerada Petroleum Corp. Each has one-third interest. The three companies jointly share a total of 47,000,000 acres, under a similar crossinterest arrangement on singly owned blocks.

Two wells in Fezzan province this year further livened interest in the Algeria border area. Esso Standard of Libya encountered oil sands at three intervals in 1 Haghe, the first test in its border block. Zones were at 500, 900, and 1,100 to 1,200 ft.

A core-drilling crew working for Mobil Oil Co. of Canada hit a high-pressure gas zone in the concession south of Esso's. The gas zone was topped at 1,500 ft.

These holes kept alive the interest stirred last year by the French-Royal Dutch-Shell discovery at Edjele, across the border. Several companies have snapped up open acreage since then, and 92,000 sq. miles in the province is now under concession or application.

An American independent in continuing its one-rig program in Cyrenaica. Libyan American Oil Co. is drilling ahead in its third test, located on the Mediterranean Coast, 4 miles from Bachi. The company's second test, in the interior of the province, was bottomed this year at 8,600 ft. as a dry hole. Libyan American is a subsidary of Texas Gulf Producing Co. W. R. Grace has 49 per cent interest in the venture.

Other concession holders or applicants in Libya include Anglo-Saxon Petroleum Co. (Shell), Gulf Oil Corp., Caltex, Cie. Francaise des Petroles, a British Petroleum Co. Ltd. subsidiary, and Bunker Hunt, Dallas.

Morocco

Crude production from numerous small fields in Morocco has slipped to 1,500 bbl. daily. Ste. Cherifiennes des Petroles is the operator. Empresa Nacional Adaro is carrying on limited work in North Zone, formerly Spanish Morocco.

Tunisia

Conorada Petroleum Corp. may become the first company to obtain a concession in Tunisia since the country gained its independence.

The exploration company, owned by Contiental Oil Co., Amerada Petroleum Corp., and Ohio Oil Co., applied for a 11,000-sq.-mile area in the west-central part of the country. A company jointly owned by the French and Tunisian governments is currently the only company in the country.

East Africa

More than half a dozen companies are sinking exploration money into one of the world's least known areas that stretches for thousands of miles along the East African Coast.

BP Development Co. of Tanganyika will start its third well in East Africa soon on a location staked in southern Tanganyika. The company, in which Royal Dutch-Shell has half interest, also has a concession in Kenya.

Sinclair Somal Corp. started its second deep test on a 92,000-sq.-mile concession in Somalia. Sinclair Oil Corp. has half interest. Contiental Oil Co., Ohio Oil Co., and Amerada Petroleum Corp. share the remainder. An Italian Government company, AGIP-Mineraria, has a drilling program on a smaller concession in the northern part of the country.

Sinclair this year pulled out of Ethiopia, where it had held acreage for several years. Poor future prospects were the reason.

Two companies are working in British Somaliland. They are Standard-Vacuum Oil Co. and Conorada Petroleum Corp., owned by Amerada, Ohio, and Continental. Gulf Oil Corp. has a concession in Mozambique. A French company has been drilling for years on Madagascar.

West Africa

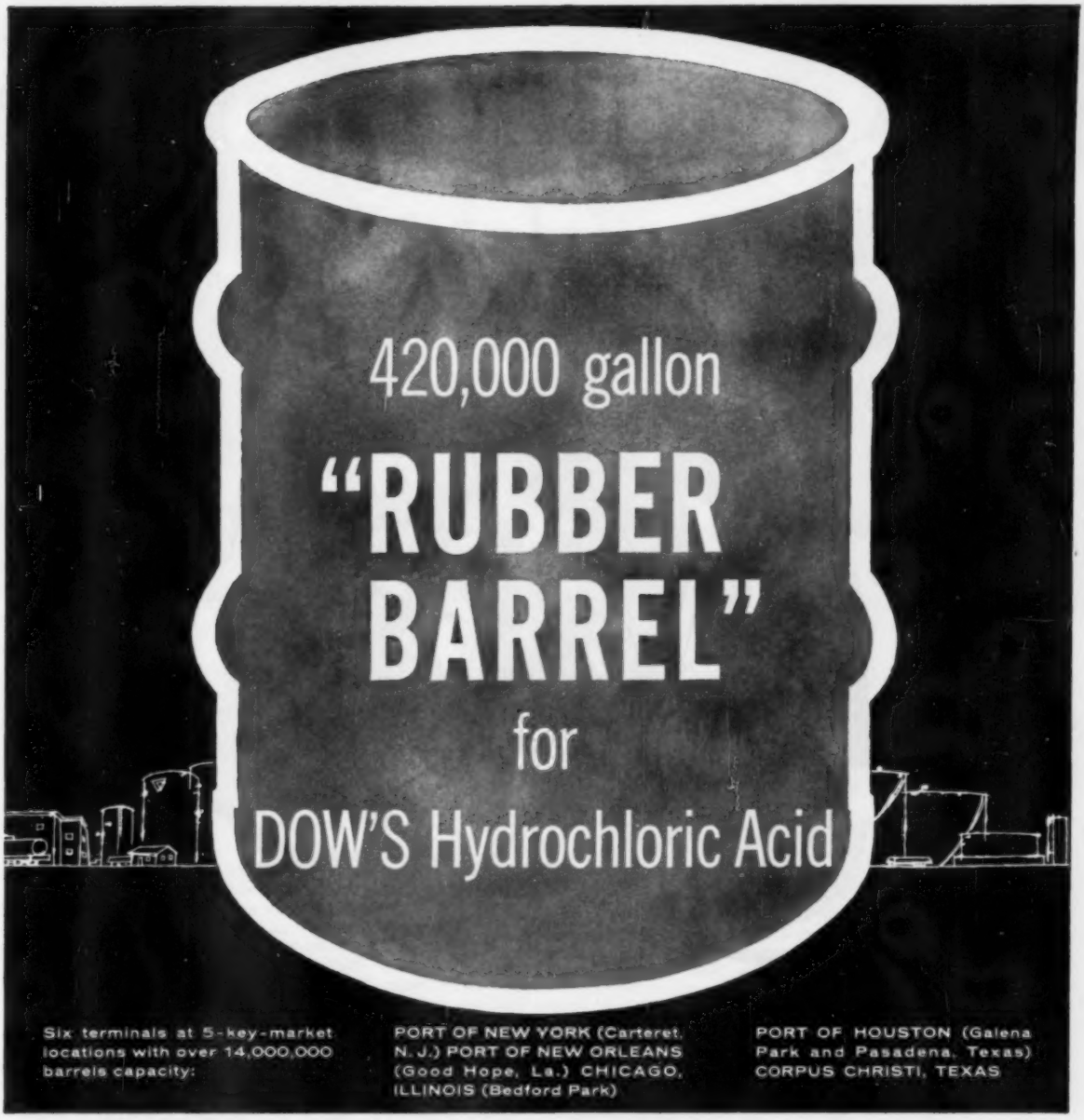
After years of tough, expensive exploration work, West Africa is yielding its first commercial crude.

Shipments from Gabon, French Equitorial Africa, are averaging 3,500 bbl. daily. Output from the small Pointe-Clairette and Ozouri fields in the Ogoue River Delta is refined in France. Ste. de Petroles d'A.E.F. may have another field at M'bega, where a wildcat tested 50 bbl. per hour from 2,560 ft. The company also is exploring in the French Cameroons.

A Petrofina subsidiary has developed Benfica field in Angola to the point where a 2,000-bbl.-daily topping plant can be used. The company will incorporate the unit into a 10,000 to 20,000-bbl.-daily refinery it plans to build later.

Shell-BP Petroleum Development Co. of Nigeria may have the bigest find in that part of Africa. The company is not ready to call its Oloibiri field commercial. But it will open at the turn of the year a 65-mile, 10-in. temporary crude line to Port Harcourt to take off crude during trials. Wells will be tested at the rate of 1,000 bbl. daily.

Five rigs are running in the Niger River Delta concession. The company also has an extensive shallow-water drilling program in tidal swamps that extend 30 to 40 miles offshore. It has a Dutch-built barge for the program. Socony Mobil Oil Co., Inc., has a concession in the northern part of the country.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INTERNATIONAL OIL DIRECTORY

Here's an up-to-date and useful listing of oil companies operating outside the United States and Canada, together with their home-office addresses and principal officers. Data on ownership and operations are presented. Companies engaged exclusively in marketing are not included.

ABU DHABI MARINE AREAS, Britannic House, Finsbury Circus, London, E.C. 2.

• Holds a 12,000-sq.-mile concession in the Persian Gulf off the Trucial Coast shaikhdom of Abu Dhabi. Two-thirds interest held by British Petroleum Co., Ltd., one-third by Cie. Francaise des Petroles. Dubai Marine Areas, Ltd., under the same ownership, has a Persian Gulf concession over the neighboring shaikhdom of Dubai.

ADMINISTRACION NACIONAL DE COMBUSTIBLES, ALCOHOL Y PORTLAND (ANCAP), Av. Agraciada y Paraguay, Montevideo, Uruguay.

• Government crude and alcohol-refining agency. Has at Montevideo 28,000-bbl.-daily refinery being doubled in size. Owns transportation and storage facilities.

Officers: Alberto Ponce de Leon, sec. gerencia gen.

AGIP MINERARIA SPA, 1 Via. F. lli Gabba, Milan, Italy.

• AGIP is the operating company for Ente Nazionale Idrocarburi (ENI), Italy's government oil agency. It has integrated operations in Italy directly and through other companies.

It has a joint interest with National Iranian Oil Co. in three Iranian concessions outside the consortium area. Rights are held by a 50-50-owned company, Ste. Irano-Italienne des Petroles (SIRIP).

Ninety per cent owned subsidiaries have 22.3 per cent interest in International Egyptian Oil Co. and a concession over northern Somalia.

Officers: E. Mattei, pres.

AMERADA PETROLEUM CORP., 120 Broadway, New York 5.

• Foreign interests include 64.5 per cent ownership in Esperanza Petroleum Corp., which has undeveloped concessions over 200,000 acres in Venezuela. It has one-third interest in Conorada Petroleum Corp., and has one-third interest in a 55,000-sq.-mile area in Libya, one-third interest in a 36,000-sq.-mile area in British Somaliland, and one-sixth in a 92,000-sq.-mile area in Somalia, as well as concession interests in Guatemala.

Officers: A. Jacobsen, chair.; E. H. McCullough, pres.; B. B. Weatherby, sen. v.p.; C. E. Boone, v.p.; A. R. Denison, v.p.

AMERICAN INDEPENDENT OIL CO. (AMINOIL), 111 Sutter Street, San Francisco.

• Has concession over Kuwait's undivided half interest in the Neutral Zone, where total output has passed 78,000 bbl. daily. Also has less than 1 per cent interest in Iranian Oil Participants, Ltd., through part ownership in Iricon Agency, Ltd.

Aminoil owners and their percentage interests are: Phillips Petroleum Co., 33.54; Hancock Oil Co., 15.08; Signal Oil & Gas Co., 15.08; Ashland Oil & Refining Co., 12.7; Ralph K. Davies, 8.25; J. S. Abercrombie, 6.35; Crescent Corp., 3.17; Sunray Mid-Continent Oil Corp., 2.65; Globe Oil & Refining Co., 1.59; Lario Oil & Gas Co., 1.59.

Officers: R. K. Davies, pres.; G. Witherspoon, gen. mgr. in Kuwait.

AMERICAN INDEPENDENT OIL CO. DE MEXICO, 1-204 Reforma, Mexico City, D.F., Mexico.

• Handles interests of its parent, American Independent Oil Co., in a joint exploration and development drilling program in Mexico under an agreement between Petroleos Mexicanos and three independents. Aminoil and Mexofina each hold 43⅓ per cent, and E. W. Pauley, 13⅓ per cent. The group produces about 1,000 bbl. daily.

Officers: R. K. Davies, pres.; G. Calleya, gen. mgr.

AMERICAN OVERSEAS PETROLEUM, LTD., 380 Madison Avenue, New York 17.

• Amoseas is the exploration member of the Caltex group. It is working in the Philippines, Australia, France, Libya, and Turkey.

Officers: H. H. Arnold, chair.; G. M. Cunningham, pres.

ANDIAN NATIONAL CORP., LTD., 366 Alhambra Circle, Coral Gables, Fla.

• A subsidiary of International Petroleum Co., Ltd., operating a 335-mile, 10-in. common-carrier pipeline. The system carries crude from Central Colombian fields to Cartagena on the Atlantic Coast. Its capacity is 70,000 bbl. daily.

Officers: M. M. Brisco, pres.

ANGLO - ECUADORIAN OILFIELDS, LTD., Casilla 410, Guayaquil, Ecuador.

• The largest producer in Ecuador. Output is about 7,000 bbl. daily from fields near Santa Elena on the coast. Has a 5,000-

bbl.-daily refinery at La Libertad. A new 7,700-bbl. daily plant will open in mid-1958. Lobitos Oilfields, Ltd., and South American Gold & Platinum Co. each have about 34 per cent interest.

Officers: F. C. Bowring, chair.; G. W. V. Rumble, gen. mgr.

ANGLO-EGYPTIAN OILFIELDS, LTD., Shell House, Cairo.

• An Egyptian producing and refining company. Net output averages about 28,000 bbl. daily from fields held alone and jointly with Socony Mobil Oil Co., Inc. A 44,000-bbl.-daily refinery is located at Suez. The Egyptian Government, part owner, sequestered the interests of Royal Dutch-Shell and British Petroleum Co., Ltd., last year. BP and Shell each own 31 per cent.

APEX (TRINIDAD) OILFIELDS, LTD., 208-224 Salisburg House, London Wall, London, E.C. 2.

• Produces about 12,000 bbl. daily of crude and condensate from properties on Trinidad.

AQUITAINE, STE. NATIONALE DES PETROLES, 12 Rue Jean Nicot, Paris (7e).

• SNPA operates Lacq natural gas field in southwestern France, with proved reserves of several trillion cubic feet. Small crude output is taken from an overlying oil field.

Officers: A. Blanchard, pres. and dir. gen.

ASHLAND OIL & REFINING CO., 1401 Winchester Avenue, Ashland, Ky.

• Has a 10.79 per cent interest in 24,700-acre Lot 17 in Lake Maracaibo, awarded by Venezuela. Also has an interest in the Middle East through 12.7 per cent interest in American Independent Oil Co.

Officers: Rexford S. Blazer, chair.; Everett F. Wells, pres.

ARABIAN AMERICAN OIL CO., Dhahran, Saudi Arabia, 505 Park Avenue, New York 22.

• Aramco handles all crude production in Saudi Arabia, holding a 365,000-sq.-mile concession over the eastern part of the country, including territorial and offshore areas. Output normally is more than 1,000,000 bbl. daily. A 189,000-bbl.-daily refinery is located at Ras Tanura.

Owner companies are Standard Oil Co. of California, The Texas Co., and Standard Oil Co. (N. J.) with 30 per cent each, and Socony Mobil Oil Co., Inc., 10 per cent.

Officers: F. A. Davies, chair., Dhahran; R. G. Follis, vice chair., San Francisco; R. L. Keyes, pres., Dhahran; N. Hardy, exec. v.p., Dhahran.

ASSAM OIL CO., LTD., Britannic House, Finsbury Circus, London, E.C. 2.

• A wholly owned subsidiary of Burmah Oil Co., Ltd., producing 8,500 bbl. daily from Digboi and Nahorkatiya fields in Northeast India. Nahorkatiya will be opened to about 50,000 bbl. daily upon completion of a planned pipeline outlet.

Officers: W. P. G. Maclachlan, gen. mgr.

ATLANTIC REFINING CO., 260 South Broad Street, Philadelphia 1.

• Venezuela is the chief area of Atlantic's foreign operations. Output averaged 22,700 bbl. daily the first 7 months this year. Subsidiaries have acquired an interest in new concessions in Lake Maracaibo and elsewhere in the Venezuela, and have an interest in Cuban and Guatamalan exploration. Atlantic also holds one-twelfth of 5 per cent interest in Iranian Oil Participants, Ltd.

Officers: H. Supplee, Jr., pres.; vice presidents: P. G. Wharton, D. T. Colley, H. W. Field, H. W. Jones, W. F. Stroud, L. A. Sunkel, and H. G. Schad.

ATTOCK OIL CO., LTD., 24-28 Lombard Street, London, E.C. 3.

• Operates a 5,000-bbl.-daily refinery at Rawalpindi, West Pakistan, which processes its own and Pakistan Petroleum. Ltd., crude.

Officers: T. T. McCreath, chair.

BAHRAIN PETROLEUM CO., LTD., 380 Madison Avenue, New York 17.

• A member of the Caltex group, holding a concession over Bahrain Island. Output averages 30,000 bbl. daily. A 205,000-bbl.-daily refinery is supplied chiefly by crude from Saudi Arabia.

BASRAH PETROLEUM CO., LTD., 214 Oxford Street, Oxford Circus, London, W. 1.

• An affiliate of Iraq Petroleum Co., Ltd., operating fields in southern Iraq. Output first 8 months of year averaged 172,400 bbl. daily. Pipelines connect the fields to a Persian Gulf terminal at Fao, Iraq's only seaport. Ownership and management is same as IPC.

BRITISH PETROLEUM CO., LTD., Britannic House, Finsbury Circus, London, E.C. 2.

• BP is a major international company. The Eastern Hemisphere is its chief, but not exclusive area of operations. It is the leading crude offtaker in the Middle East. Crude production last year averaged about 1,000,000 bbl. daily, refinery runs 650,000 bbl. daily, and product sales 1,060,000 bbl. daily. It is controlled by the British Government.

The company's Middle East production, amounting to about 99 per cent of its total supply, is obtained through 50 per cent interest in Kuwait Oil Co., Ltd., 40 per cent in Iranian Oil Participants, Ltd., and 23¾ per cent in Iraq Petroleum Co., Ltd., and affiliated companies, which handle production in Iraq and Qatar.

Elsewhere, BP group has small production to its account in Canada and Trinidad, and its handles domestic production in United Kingdom. It has direct, or joint exploration programs in all producing areas, and in at least 18 other regions. Included are programs in Nigeria, Libya, Sicily, and Papua.

Along with an interest in refineries through Middle East operating companies, BP has refineries at Aden and in Australia. It has four plants in U.K. and five elsewhere in Europe.

Officers: Managing directors: N. A. Gass, chair.; M. R. Bridgeman, R. Gillespie, J. M. Pattinson, and H. E. Snow.

BRUNEI SHELL PETROLEUM CO., LTD., Seria, State of Brunei, Borneo.

• A Shell group company producing 118,000 bbl. daily from Seria field in British Borneo. Its name was changed this year from British Malayan Petroleum Co., Ltd.

Officers: R. E. Hales, chair.

BURMAH OIL CO., LTD., 175 West George Street, Glasgow, C. 2.

• Burmah Oil is an integrated company in its own right. It also holds 26.7 per cent of the ordinary shares of British Petroleum Co., Ltd., and nearly 3 per cent of the ordinary shares of "Shell" Transport & Trading Co., Ltd.

It is majority owner of Burmah Oil Co. (1954), Ltd., which has a 3,000 bbl. daily refinery at Chaulk and a new 3,500-bbl. plant at Syriam. Crude output is tailored to refinery needs.

In India, the wholly owned Assam Oil Co., Ltd., operates a refinery at Digboi, fed by 8,500 bbl. daily produced from Digboi and Nahorkatiya fields. Nahorkatiya will produce on the order of 50,000 bbl. daily when a planned pipeline outlet is completed. Burmah Oil also has half interest in the 40,000 bbl. daily refinery of Burmah-Shell Refineries, Ltd., at Bombay.

In Pakistan, the 70 per cent owned Pakistan Petroleum Co., Ltd., operates the major Sui natural gas field and has small crude production. Burmah Oil also has substantial interest in Sui Gas Transmission Co., Ltd., which transports gas to Karachi and other areas.

Officers: W. E. Eadie, chair.; R. P. Smith, man. dir.

CALIFORNIA EXPLORATION CO., 200 Bush Street, San Francisco.

• A subsidiary of Standard Oil Co. of California. Studies geology, law, and economics relating to foreign exploration.

Officers: K. H. Crandall, chair.; H. F. Davies, pres.

CALIFORNIA TEXAS OIL CO., LTD. (CALTEX), 380 Madison Avenue, New York 17.

• The firm is a service company in the Caltex group, which consists of nearly 100 companies operating in more than 70 countries of the Eastern Hemisphere. Ownership is held jointly by Standard Oil Co. of California and The Texas Co. Crude output by the group last year was 88,600 bbl. daily in Sumatra and 30,100 bbl. daily on Bahrain. Refinery runs averaged 425,800 bbl. daily, and product sales, 600,400 bbl. daily.

Group companies own or have an interest in 15 refineries in 10 countries: Australia, Philippines, Japan, Italy, Spain, France, Netherlands, Lebanon, Bahrain, and India. Exploration programs are under way in Australia, France, Libya, Philippines, and Turkey.

Officers: William F. Bramstedt, chair.; Alexander J. Singleton, pres.; Harold C. Hose, exec. v.p.

CIA. ESPANOLA DE PETROLES, S.A., Apartado 671, Alcala 31, Madrid, Spain.

• CEPSA operates a 65,000-bbl.-daily refinery at Sta. Cruz de Tenerife, Canary Islands, and has 24 per cent interest in a 45,000-bbl.-daily refinery at Escombreras, Spain. It has about 1,000 bbl. daily in royalty production in Venezuela, and an exploration subsidiary in Spain.

CIA. SHELL DE VENEZUELA, Edificio Shell, Caracas, Venezuela.

• Shell of Venezuela is an integrated company and the leading crude producer of the Royal Dutch-Shell group. It averaged 903,400 bbl. daily the first 7 months of the year. It operates a 145,000-bbl.-daily refinery at Cardon and a 38,000-bbl.-daily plant at San Lorenzo.

Officers: G. C. K. Dunsterville, pres.; J. A. Warder, v.p.

CIE. FRANCAISE DES PETROLES (CFP), 11 Rue de Docteur Lancereaux, Paris VIIIe.

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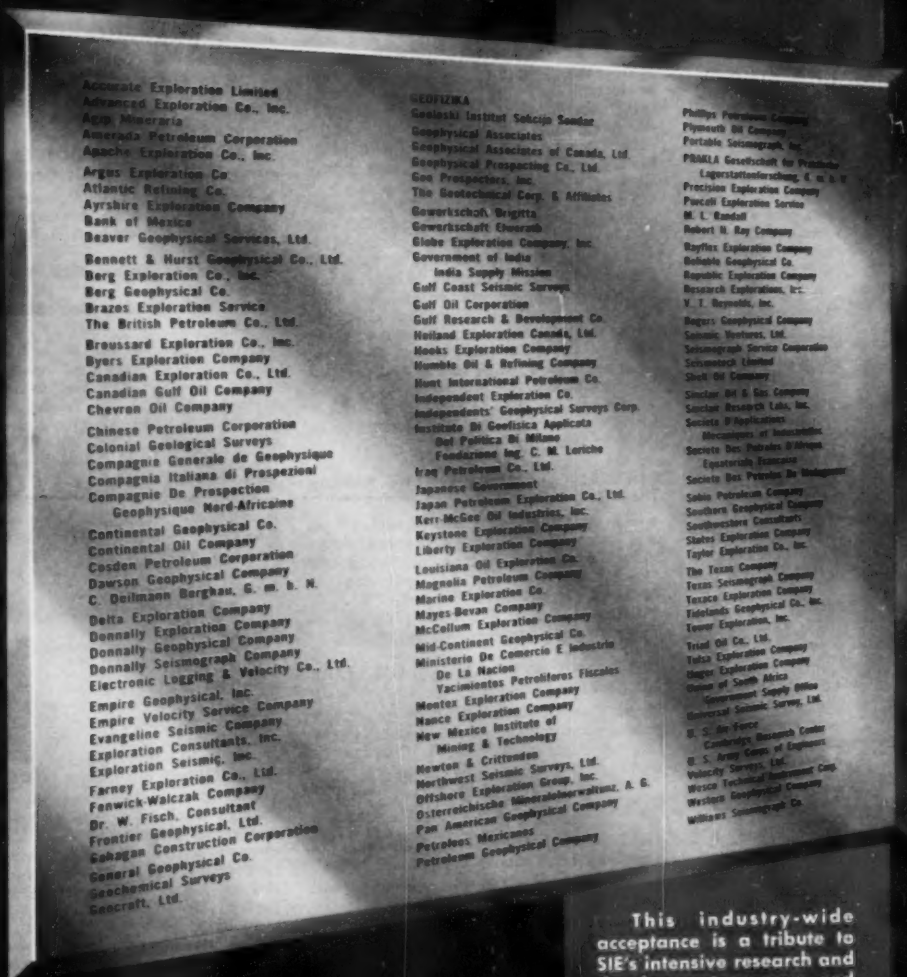

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trols through 40 per cent voting rights, has an interest in Middle East production through 23¾ per cent interest in Iraq Petroleum Co., Ltd., and affiliated companies, and 6 per cent in Iranian Oil Participants, Ltd.

It has exploration interests in the French Union and Canada. A 56 per cent owned subsidiary, Cie. Francaise de Raffinage, has two refineries in France, and half interest in an Italian refining company.

Officers: Victor de Metz, pres. and dir. gen.; R. Tassin de Montaigu, assist. dir. gen.; and Robert Cayrol, v.p.; Rene Perrin, v.p.

CITIES SERVICE CO., 60 Wall Street, New York 5.

• Exploration interests are held in many foreign areas, often jointly with Richfield Oil Corp., in which Cities Service holds 31 per cent interest. These joint operations include rights on 3,400,000 acres in Peru, where Peruvian Pacific Petroleum Co. is a wholly owned Cities Service subsidiary; 75 per cent interest in a 2,200,000-acre concession in Central Colombia; and a 32,000-sq.-mile concession in Dhofar, on the southern part of the Arabian Peninsula. The company is one of four holding concessions over Egypt's Western Desert, and it has permits on 700,000 acres in southeastern Italy.

Officers: W. Alton Jones, chair.; Burl S. Watson, pres.; vice presidents: Alfred P. Frame, George H. Hill, Jr., Charles S. Mitchell.

COLOMBIAN PETROLEUM CO., Apartado 100, Cucuta, Colombia.

• Colpet is a wholly owned subsidiary of Socony Mobil Oil Co., Inc., and The Texas Co. It holds the Barco concession and other acreage in Colombia. Output is better than 26,000 bbl. daily.

Officers: F. H. Wilcox, pres.; J. L. Bower, exec. v.p.

COLON DEVELOPMENT CO., LTD., Edificio Shell, Caracas, Venezuela.

• A Shell-group company producing about 20,000 bbl. daily from concessions southwest of Lake Maracaibo in Venezuela. Canadian Shell, Ltd., holds about 96 per cent interest.

Officers: G. C. K. Dunsterville, chair.

COLSAG CORP., 135 East Forty-Second Street, New York 17.

• Carries on integrated operations in Colombia through subsidiaries. It is 50 per cent owned by The Texas Co.

Officers: F. H. Wilcox, pres.; J. O. Bower, W. A. Clark, H. T. Dodge, H. I. Fry, F. L. LeRoy.

CONORADA PETROLEUM CORP., 630 Fifth Avenue, New York.

• An exploration subsidiary outside North America for its three parent companies, Amerada Petroleum Corp., Continental Oil Co., and Ohio Oil Co. It is active in various areas of Central and South America, and Africa.

Officers: C. F. Dohm, pres.; B. F. Uhl, v.p.

CONTINENTAL OIL CO., 1300 Main Street, Houston 2.

• Continental has extensive foreign holdings through joint ventures with other companies. In Venezuela, it has 25 per cent interest in a five-company group holding 150,000 acres under concession in the Gulf of Paria. It has one-third interest in Conorada Petroleum Corp. and has interests in Guatemala, Libya, Somalia, and British Somaliland. Its wholly owned subsidiary, Sahara Petroleum Co., is operator for concessions in Egypt's Western Desert, held by a four-company group.

Officers: James J. Cosgrove, chair.; L. F. McCollum, pres.; Charles A. Perlitz, Jr., exec. v.p.; E. F. Battson, v.p. and chair. of exec. comm.; Ira H. Cram, Harold G. Osborn, and A. W. Tarkington, sen. v.p.'s.

CREOLE PETROLEUM CORP., 1239 Avenue of the Americas, New York 20.

• Creole is the leading crude producer in Venezuela and is one of the major subsidiaries of Standard Oil Co. (N. J.), which holds 95 per cent interest. Its net crude production plus purchased royalty oil the first 7 months of this year averaged 1,238,100 bbl. daily. About four-fifths of this output came from Lake Maracaibo fields. Most of the remainder came from eastern Venezuela.

The company carries on integrated operations in Venezuela, which includes the operation of two refineries. A plant at Amuay is being enlarged from 224,000 bbl. daily to 329,000 bbl. daily. The Carapito plant has a capacity of 68,000 bbl. daily.

The company has more than 3,000,000 acres under concession, including grants won in bidding the last 2 years. These new areas include a block of 25,444 acres in Lake Maracaibo.

Officers: H. W. Haight, pres.; H. A. Jarvis, exec. v.p.; H. A. Metzger, v.p.; D. E. Stines, v.p.

CRESCENT CORP, Atlas Life Building, Tulsa 1.

• Has an interest in Cuba through 17 per cent interest in Siboney-Caribbean Petroleum Co. It also has an interest in the Middle East through 3.17 per cent of American Independent Oil Co.

Officers: W. H. Garbade, pres.; H. R. Bolton, v.p. explor. and prod.

DEILMANN MONTAN G.M.B.H., P.O.B. 20, Bentheim, Germany.

• A West German crude and natural-gas producer. Company has interests in exploration in Spain, Greece, Turkey, and Yeman.

Officers: C. Deilmann and H. Gunther, directors.

DEUTSCHE ERDOL-A.G., Mittelweg 180, Hamburg 13, Germany.

• An independent German company with integrated operations in West Germany. It is one of three German companies with 50 per cent operating interest in Cia. Peruana de Petroleo "El Oriente," S. A., which holds concessions in Peru's Amazon basin.

ESSO REP, 82 Ave. des Champs-Elysees, Paris 8e, France.

• Produces about 25,000 bbl. daily from Parentis and smaller nearby fields in southwestern France. Esso Standard S.A.F., in which Standard Oil Co. (N.J.) holds 63 per cent, owns 89 per cent. French interests own the remainder.

Officers: S. Scheer, pres.; J. de Vries, mgr. in chg.

GENERAL AMERICAN OIL CO. OF TEXAS, Meadows Building, Dallas 6.

• GAO has about 50 per cent interest in an American syndicate exploring in Spain jointly with a government-owned corporation. It also has one-eighth interest in a similar syndicate operating in the Latina Valley of Western Italy.

Officers: M. E. Wilson, chair.; G. Simpson, pres.

GETTY OIL CO., 206 Pennsylvania Building, Wilmington 1, Del.

• Foreign operations of Getty Oil include a concession over Saudi Arabia's undivided half interest in the Neutral Zone, where total output has passed 70,000 bbl. daily. Company has one-twelfth of 5 per cent interest in Iranian Oil Participants, Ltd., through part ownership of Iricon Agency, Ltd. It also has an interest in other foreign operations through part ownership of Tidewater Oil Co.

Officers: J. P. Getty, pres.

GEWERKSCHAFT BRIGITTA. Kolbergstrasse 14, Hannover 11, Germany.

• A jointly owned Shell group and Standard Oil Co. (N.J.) company producing about 2,500 bbl. daily from West German fields.

Officers: G. Geyer, chair.

GULF OIL CORP., Gulf Building, Pittsburgh.

• Gulf is one of the major international companies with integrated operations both in the United States and in many areas of the free world. Net crude oil and condensate produced to Gulf's account last year averaged 962,900 bbl. daily, refinery runs, 667,800 bbl. daily, and product sales, 695,700 bbl. daily.

The company's main source of crude is Kuwait through its half ownership of Kuwait Oil Co., Ltd. Its share of production last year was 465,700 bbl. daily. Gulf has an interest in additional Middle East production and refining through 7 per cent ownership in Iranian Oil Participants, Ltd.

In Venezuela, the company netted 149,000 bbl. daily through a wholly owned subsidiary, Mene Grande Oil Co. This company has in progress an extensive exploration program. It recently was awarded 126,900 acres in Lake Maracaibo. Half of Mene Grande's gross production is owned by two other companies.

Gulf has crude production in Europe through a wholly owned subsidiary which discovered Ragusa field in Sicily, and through a minority interest in Parentis field in France. It has exploration activities in Cuba, Bahamas, Barbados, Peru, Bolivia, Mozambique, Ghana, Liberia, and Cabinda.

The company's net refinery runs outside the U.S. and Canada averaged 108,300 bbl. daily through an interest in plants in Venezuela, Puerto Rico, Kuwait, Iran, and France.

Officers: W. K. Whiteford, pres.; R. O. Rhoades, senior v.p., prod.

HANCOCK OIL CO., 2828 Junipero Avenue, Long Beach.

• Has one-third interest in a 1,232,000-acre concession in Bolivia, and is one of a four-company group awarded 27,600-acre Lot 4 in Lake Maracaibo by Venezuela. It has an interest in Middle East concessions through 15.08 per cent interest in American Independent Oil Co. and through one-twelfth of 5 per cent in Iranian Oil Participants, Ltd.

Officers: John W. Hancock, pres.; W. T.

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Hancock, exec. v.p.; J. J. Shrewsbury, v.p.; B. H. Dresser, v.p.; P. T Martin, v.p.

INTERNATIONAL PETROLEUM CO., LTD., 396 Alhambra Circle, Coral Gables, Fla.

• International is an 83 per cent owned subsidiary of Standard Oil Co. (N. J.) with integrated operations either directly or through subsidiaries in Colombia and Peru. It also has 25 per cent interest in crude production of Mene Grande Oil Co.

Crude production last year averaged 122,900 bbl. daily, 74 per cent of which came from Venezuela. Virtually all the remainder came from fields along the northern Peruvian coast.

In Colombia, the company operates a 36,500-bbl.-daily refinery at Barrancabermeja on a lease basis from the government. Its own 26,500-bbl.-daily plant under construction at Cartagena is due on stream late this year. In Peru, the company has a 44,000-bbl.-daily plant at Talara.

Officers: Michael L. Haider, pres.; M. M. Brisco, exec. v.p.

IRANIAN OIL EXPLORATION & PRODUCTION CO., (Iraanse Aardolie Exploratie en Productie Mij N.V.), Teheran, Iran.

• Exploration and producing company over a 100,000-sq.-mile area in Iran. Formed under 1954 agreement between the Iranian Government, National Iranian Oil Co., and the consortium group. Output averaged 694,000 bbl. daily the first 7 months of the year.

Officers: K. Scholtens, gen. man. dir.

IRANIAN OIL PARTICIPANTS, LTD., 3 Finsbury Square, London, E.C. 2.

• Holding firm for operating companies in Iran organized under a 1954 agreement between the Iranian Government, National Iranian Oil Co., and a consortium group.

Shareholders are British Petroleum Co., Ltd., 40 per cent; Royal Dutch-Shell, 14 per cent; Cie. Francaise des Petroles, 6 per cent; and 7 per cent each, Standard Oil Co. (N. J.), Socony Mobil Oil Co., Inc., Gulf Oil Corp., The Texas Co., and Standard Oil Co. of California.

The remaining 5 per cent is held by Iricon Agency, Ltd., whose owners in varying amounts are Richfield Oil Corp., American Independent Oil Co., Standard Oil Co. (Ohio), Getty Oil Co., Signal Oil & Gas Co., Atlantic Refining Co., Hancock Oil Co., Tidewater Oil Co., and San Jacinto Petroleum Corp.

Officers: J. Addison, gen. mgr.

IRANIAN OIL REFINING CO., (Iraanse Aardolie Raffinage Mij N.V.), Teheran, Iran.

• Refining company in Iran under 1954 agreement between the Iranian Government, National Iranian Oil Co., and the consortium group. Runs averaged 325,000 bbl. daily the first 7 months of the year at the 514,000-bbl.-daily-capacity Abadan refinery.

Officers: K. Scholtens, gen. man. dir.

IRAQ PERTOLEUM CO., LTD., 214 Oxford Street, Oxford Circus, London, W. 1.

• IPC has a 32,000-sq.-mile concession in northeastern Iraq. Output averaged 189,100 bbl. daily the first 8 months of the year, held down by damage to the company's pipeline system to the Mediterranean Coast. The system normally carries more than 500,000 bbl. daily to terminals at Tripoli, Lebanon, and Banias, Syria.

Affiliated companies produce crude elsewhere in Iraq and in Qatar, and operate a 11,550-bbl.-daily refinery at Tripoli.

Parent companies are British Petroleum Co., Ltd., 23¾ per cent; Royal Dutch-Shell, 23¾ per cent; Cie. Francaise des Petroles, 23¾ per cent; Standard Oil Co. (N. J.) and Socony Mobil Oil Co., Inc., a joint 23¾ per cent through Near East Development Corp.; and Participations & Exploration Corp. (Gulbenkian estate), 5 per cent.

Officers: Adm. Sir J. H. D. Cunningham, chair.; G. H. Herridge, man. dir.; H. W. Fisher, exec. dir. with title joint man. dir.

IRICON AGENCY, LTD., 1 Albemarle Street, London, W. 1.

• Holding company for 5 per cent interest in Iranian Oil Participants, Ltd., owned by United States independents. Parent companies are Richfield Oil Corp., one-fourth; American Independent Oil Co., one-sixth; and one-twelfth each: Standard Oil Co. (Ohio), Getty Oil Co., Signal Oil & Gas Co., Atlantic Refining Co., Hancock Oil Co., Tidewater Oil Co., and San Jacinto Petroleum Corp.

Officers: S. K. McCauley, pres.

KERN OIL CO., LTD., Barrington House, Love Lane, London, E.C. 2.

• Kern Oil is a British-based company with operations in the Western Hemisphere. It has producing properties in California under its own name and holds leases in several states through St. Helens Petroleum Corp. Other subsidiaries are Kern-Mex Oilfields, S.A., in Mexico, and Kern Trinidad Oilfields, Ltd., in Trinidad. Total crude output is about 6,300 bbl. daily.

Officers: G. W. Ivey, chair.

KHANAQIN OIL CO., LTD., Britannic House, Finsbury Circus, London, E.C. 2.

• A member of the BP group producing about 4,000 bbl. daily from Khanaqin field on the eastern Iraq frontier. The field was in Iran before a border adjustment.

Officers: N. A. Gass, chair.

KUWAIT OIL CO., LTD., Burgan House, 105 Wigmore Street, London, W. 1.

• The operating company in Kuwait. It holds a concession over the entire state and normally produces well over 1,000,000 bbl. daily. Joint owners are British Petroleum Co., Ltd., and Gulf Oil Corp.

Officers: C. A. P. Southwell, man. dir.

LAGO OIL & TRANSPORT CO., LTD., Aruba, Netherlands West Indies.

• A wholly owned refining and marketing subsidiary of Standard Oil Co. (N. J.). Owns 440,000-bbl.-daily refinery at Aruba, which processes mostly crude supplied by another Jersey subsidiary, Creole Petroleum Corp.

Officers: O. S. Mingus, pres.; S. E. Griffen, exec. v.p.

LAPIDOTH ISRAEL PETROLEUM CO., LTD., 30 Levontin Street, Tel-Aviv, Israel.

• Operates jointly with Israel Oil Prospectors, Ltd. Production is from Heletz field, 30 miles south of Tel-Aviv. Output is about 1,200 bbl. daily.

Officers: I. Barnea, gen. mgr.

LOBITOS OILFIELDS, LTD., 59 Pall Mall, London, S.W. 1.

• Engages in producing, refining, and marketing. A subsidiary, Cia. Petrolera Lobitos, has more than 21,000-bbl.-daily output in Peru on properties in which International Petroleum Co., Ltd., this year acquired half interest. A 34.4 per cent owned company, Anglo-Ecuadorian Oilfields, Ltd., produces about 7,000 bbl. daily in Ecuador. A 4,000-bbl.-daily refinery is located at Ellesmere Port, England.

Officers: F. C. Bowring, chair.; J. E. Hall, dir. and gen mgr.

MENE GRANDE OIL CO., Gulf Building, Pittsburgh.

• Mene Grande is the Venezuelan producing subsidiary of Gulf Oil Corp., wholly owned through Venezuela Gulf Oil Co. It averaged 414,600 bbl. daily the first 7 months of the year, and is currently carrying on the country's most active drilling program. Half the crude output is owned equally by International Petroleum Co., Ltd., and Cia. Shell de Venezuela.

Officers: I. G. Davis, pres.; D. Proctor, exec. v.p.

MOBIL OVERSEAS OIL CO., INC., 150 East Forty-second Street, New York 17.

• Mobil Overseas handles foreign operations for Socony Mobil Oil Co., Inc., in the Eastern Hemisphere, except areas handled by Standard-Vacuum Oil Co., and in Latin America.

Officers: Paul V. Keyser, Jr., chair.; A. V. Danner, pres.; F. S. Cooper, v.p. in charge of coordination; C. P. Baker exec. in charge of manf.; W. G. Corwin, exec. in charge of prod.

MOSUL PETROLEUM CO., LTD., 214 Oxford Street, Oxford Circus, London, W. 1.

• An affiliate of Iraq Petroleum Co., Ltd., operating fields in Northwest Iraq. Output first 8 months of the year averaged 8,300 bbl. daily. Ownership and management is same as IPC.

N.V. CURACAOSCHE PETROLEUM INDUSTRIE MIJ., Emmastad, Curacao, Netherlands West Indies.

• A Royal Dutch-Shell company. Operates a 210,000-bbl.-daily refinery at Curacao.

Officers: J. G. A. M. Biermann, man. dir.

N.V. NEDERLANDSE AARDOLIE MIJ., 30 Carel van Bylandtlaan, The Hague, Netherlands.

• An exploration and producing company in the Netherlands with an output of about 30,000 bbl. daily. Joint owners are Royal Dutch-Shell, the operator, and Standard Oil Co. (N. J.).

N.V. NEDERLANDSCHE NIEUW GUINEE PETROLEUM MIJ., 30 Carel van Bylandtlaan, The Hague, Netherlands.

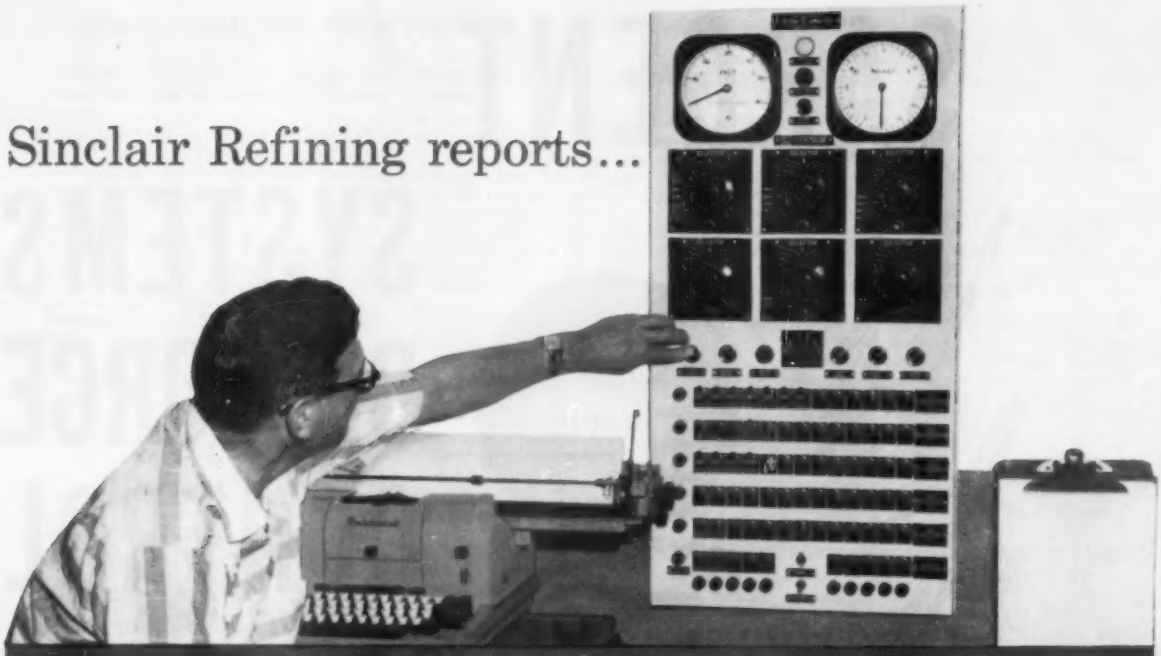
• Carries on an exploration program and produces about 6,300 bbl. daily in Netherlands New Guinea. Owners are Royal Dutch-Shell, 40 per cent; Standard-Vacuum Oil Co., 40 per cent; and Far Pacific Investments, Inc., 20 per cent.

OHIO OIL CO., 539 South Main Street, Findlay, Ohio.

• Ohio is one of a four-company group awarded a 150,000-acre concession in the Gulf of Paria by Venezuela. It has one-third interest in Conorada Petroleum Corp., and has concession interests in Guatemala, Libya, Egypt's Western Desert, Somalia, and British Somaliland.

Officers: J. C. Donnell II, pres.; C. Z. Hardwick, exec. v.p.; vice presidents: N. T. Stover, R. E. Luton, P. L. Henderson, F. E. Smith, H. C. King, F. L. Fox, J. R. Donnell, H. H. West.

Sinclair Refining reports...



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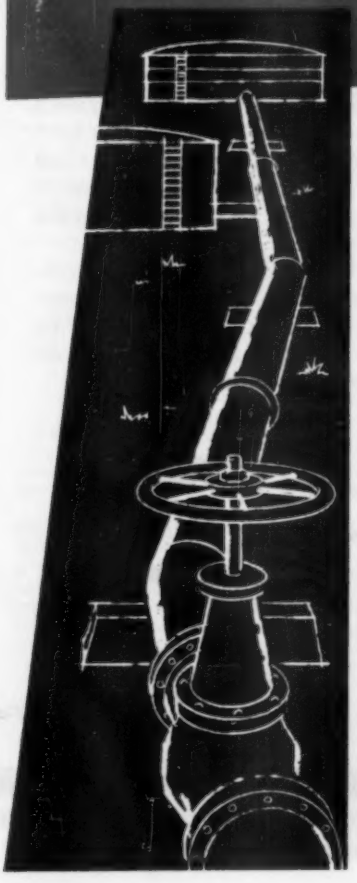

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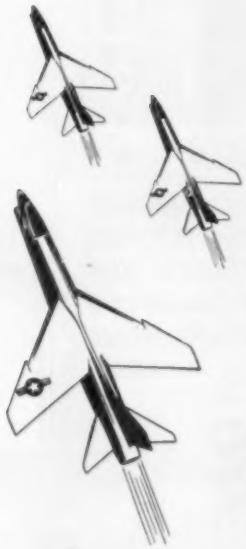

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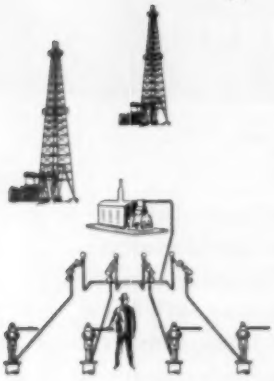

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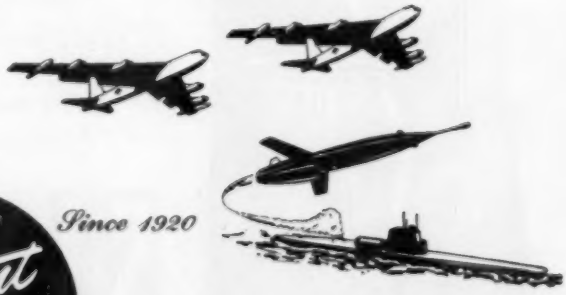

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PANTEPEC OIL CO., C.A., Esquina de Urapal, Parroquia de Candelaria, Caracas, Venezuela.

• Pantepec interests include a substantial share of net profits from Venezuelan properties sold to Phillips Petroleum Co. last year. A wholly owned subsidiary, Tri-Continent Drilling Co., Inc., has interest in Pan-Israel Oil Co., Inc., and Israel Mediterranean Petroleum, Inc. Pantepec also has 40 per cent interest in San Jose Oil Co., Inc., which holds 2,200,000 acres under concession in the Philippines.

Officers: John S. Bailey, pres.; Guy K. Stewart, v.p.

PETROFINA, 31 Rue de la Loi, Brussels, Belgium.

• An integrated company with control of producing, marketing, and tanker companies in Europe, Africa, and North America. These include American Petrofina, Canadian Petrofina, Ltd., and Canadian Fina Oil, Ltd.

Officers: Vis. Alois Van de Vyvere, chair.; Laurent Wolters, vice chair. and man. dir.

PETROLEO BRASILEIRO, S.A. (PETROBRAS), Av. Rio Branco, Rio de Janeiro, Brazil.

• Petrobras is the Brazilian Government's oil corporation handling all domestic exploration and production, and most refining. An extensive exploration program is under way. Output rose to 30,000 bbl. daily in August from established Bahia fields.

Officers: Col. A. Levy, pres.

PETROLEOS MEXICANOS (PEMEX), Av. Juarez 92-94, Mexico City 1, D.F.

• Pemex is the oil administration of the Mexican Government. It is responsible for all phases of the industry, except for some exploration and production farmed out on contracts. Crude output averages about 245,000 bbl. daily. Refining capacity is 440,000 bbl. daily.

Officers: A. J. Bermudez, gen man. dir.; managers: A. Garcia Rojas, exploration; C. L. Corcuera, refining; and A. Barnetche, exploitation.

PETROLEUM DEVELOPMENT (TRUCIAL COAST), 214 Oxford Street, Oxford Circus, London, W. 1.

• An affiliate of Iraq Petroleum Co., Ltd., exploring in the Trucial Coast of the Arabian Peninsula. Other IPC exploration affiliates are Petroleum Development (Oman), Ltd., and Petroleum Concessions, Ltd., which has a license over Aden. Ownership and management are same as for IPC.

PHILLIPS PETROLEUM CO., Phillips Building, Bartlesville, Okla.

• Phillips has extensive interest in Venezuelan concessions, including rights newly acquired in the past 2 years. Output the first 7 months on previously held acreage and on properties acquired last year from Pantepec Oil Co., C.A., averaged 14,300 bbl. daily. The company has an interest in Neutral Zone output and a small fraction of Iranian output through 33.54 per cent ownership in American Independent Oil Co.

Officers: K. S. Adams, chair.; Paul Endacott, pres.; Stanley Learned, chair. of exec. comm.; W. W. Keeler, exec. v.p.; J. M. Houchin, v.p. prod. and foreign dept.; other vice presidents: Rayburn L. Foster, B. F. Stradley, R. W. Thomas, T. S. Gay, C. O. Stark, K. E. Beall.

PURE OIL CO., 35 East Wacker Drive, Chicago, 1.

• Pure late this year obtained a 14,500,000-acre concession in Paraguay, bordering Argentina and Bolivia. Williams Brothers Sudamericana, Inc., has half interest. Pure also has one-third interest in a 1,232,000-acre concession in Bolivia, and is in a four-company group holding a new concession in Venezuela's Lake Maracaibo, the 27,600-acre Lot 4.

Officers: R. Warner, chair.; R. L. Milligan, pres.; J. Porter Langfitt, exec. v.p.; vice presidents: P. N. Gammelgard, R. B. Kelly, R. W. McIlvain, Jr., K. A. Covell, L. W. Sweet, W. V. Keeley.

QATAR PETROLEUM CO., LTD., 214 Oxford Street, Oxford Circus, London, W. 1.

• An affiliate of Iraq Petroleum Co., Ltd., holding a concession over the Shaikhdom of Qatar. Production averaged 130,500 bbl. daily the first 7 months of the year. Ownership and management is same as IPC.

RICHFIELD OIL CORP., 555 South Flower Street, Los Angeles 17.

• Richfield has extensive foreign operations, often jointly with Cities Service Co. These joint operations include rights on 3,400,000 acres in Peru, 75 per cent interest on 2,200,000 acres in Colombia, and a 32,000-sq.-mile concession in Dhofar, southern Arabia. It has about one-fourth interest in a 88,000-sq.-mile area in Egypt's Western Desert, and has a fraction of Iranian output through one-fourth of 5 per cent in Iranian Oil Participants, Ltd.

Sinclair Oil Co. and Cities Service Co. each hold about 31 per cent interest in Richfield.

Officers: Charles S. Jones, pres.; Rollin Eckis, exec. v.p.; vice presidents: David E. Day, W. G. King, Jr., R. W. Ragland, Stender Sweeney, W. J. Travers, Jr.

RICHMOND EXPLORATION CO., 225 Bush Street, San Francisco.

• Richmond is the wholly owned exploration and producing subsidiary in Venezuela of Standard Oil Co. of California. It averaged 93,600 bbl. daily the first 7 months of the year. Richmond Oil Co. and Richmond Petroleum Co. of Colombia are subsidiaries exploring in Peru and Colombia.

Officers: C. W. Reith, chair.; C. R. Cabrera, pres.

ROYAL DUTCH PETROLEUM CO., (N.V. Koninklijke Nederlandsche Petroleum Mij., 30 Carel van Bylandtlaan, The Hague, Netherlands.

• Royal Dutch Petroleum is one of the two parent companies of the Royal Dutch-Shell group, holding 60 per cent interest. "Shell" Transport & Trading Co. holds the remaining 40 per cent. The group activities are managed through two jointly owned parent operating companies, N.V. de Bataafsche Petroleum Mij. and Shell Petroleum Co., Ltd.

The group is the world's second largest oil company with integrated operations in all quarters of the free world. Last year it produced 1,663,000 bbl. daily and received another 411,000 bbl. daily under special supply contracts. It refined 2,075,000 bbl. daily of crude and natural gasoline.

Crude output came from all major producing areas. Shell Oil Co. in the United States, in which the group has 65 per cent interest, supplied 371,000 bbl. daily. Its Venezuelan production through Cia. Shell de Venezuela and Colon Development Co. was 717,000 bbl. daily.

Middle East output of 251,000 bbl. daily was through 14 per cent interest in Iranian Oil Participants, Ltd., and 23¾ per cent in Iraq Petroleum Co., Ltd., and affiliated companies. Subsidiaries in Indonesia and British Borneo produced another 223,000 bbl. daily. The remaining 101,000 bbl. daily came from various other sources including Europe, Canada, and other Latin American areas.

The group's refinery facilities are widely diversified, and are found both near major producing and marketing areas. Last year, the main processing centers were the United States, 535,000 bbl. daily; Europe, 590,000 bbl. daily; Central and South America, 575,000 bbl. daily; and Asia and Australia, 285,000 bbl. daily.

Officers: J. B. Kessler, chair.; managing directors: J. H. Loudon, pres.; F. A. C. Guepin, L. Schepers, L. E. J. Brouwer.

SAN JACINTO PETROLEUM CORP., 1107 San Jacinto Building, Houston 2.

• Has 25 per cent interest in 24,700-acre Lot 10, and 30 per cent in 1,967-acre national reserve Lot V-575 in Lake Maracaibo. Besides the Venezuelan interests, it has one-twelfth of 5 per cent interest in Iranian Oil Participants, Ltd.

Officers: B. G. Martin, pres.

SANTIAGO PETROLEUM CORP., 103 East Thirty-seventh Street, New York 16.

• Santiago is a wholly owned subsidiary of Pan-Israel Oil Co., Inc., and Israel-Mediterranean Petroleum, Inc. Direct or indirect interests include a working interest in 1,500,000 acres in Ecuador, subject to a 15 per cent interest held by Manabi Exploration Co. Manabi, which has integrated operations in Ecuador, is in turn about 50 per cent owned by Santiago.

A subsidiary, Pansicilia Co., Ltd., has a 28,000-acre concession in Sicily. Applications also have been made on 600,000 acres in Guatemala, and 250,000 acres offshore in Italy. One-eighth is held in 1,300,000 acres in western Canada.

SEABOARD OIL CO., Continental Building, Dallas 1.

• Has interest in Venezuela, including 10 per cent of two new Lake Maracaibo concessions, the 24,710-acre Lot 1, and the 24,858-acre Lot 12. Also holds, along with two other companies, concessions on over 3,000,000 acres along Turkey's southern border.

Officers: R. S. McFarland, pres.; J. P. Gasser, exec. v.p.

"SHELL" TRANSPORT & TRADING CO., LTD., 23-29 Walbrook, London, E.C. 4.

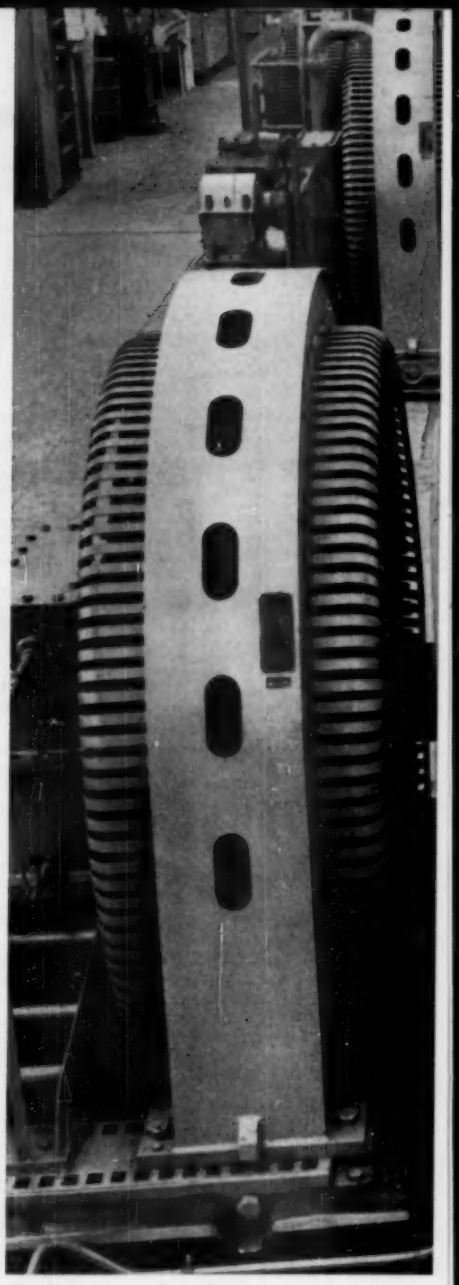
• The "Shell" company is one of two parent companies of the Royal Dutch-Shell group, holding 40 per cent interest (see Royal Dutch Petroleum Co.).

Officers: Managing directors: Lord Godber, chair.; Sir George Legh-Jones, Sir Francis Hopwood; F. J. Stephens.

SHELL TRINIDAD, LTD., Point Fortin, Trinidad.

• A Shell group company producing 21,000 bbl. daily in Trinidad from its own fields and through one-third interest in Trinidad Northern Areas. A 37,000-bbl.-daily refinery is located at Point Fortin.

Officers: G. L. Reid, chair. and man. dir.



Two 1500 hp motor-driven JM compressors handling compression of synthesis gas, before conversion to ammonia.

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This installation at the Tuscola, Illinois plant of U. S. Industrial Chemical Co., a division of National Distillers and Chemical Corp., is typical of the many processing plants using reliable Cooper-Bessemer compressors.

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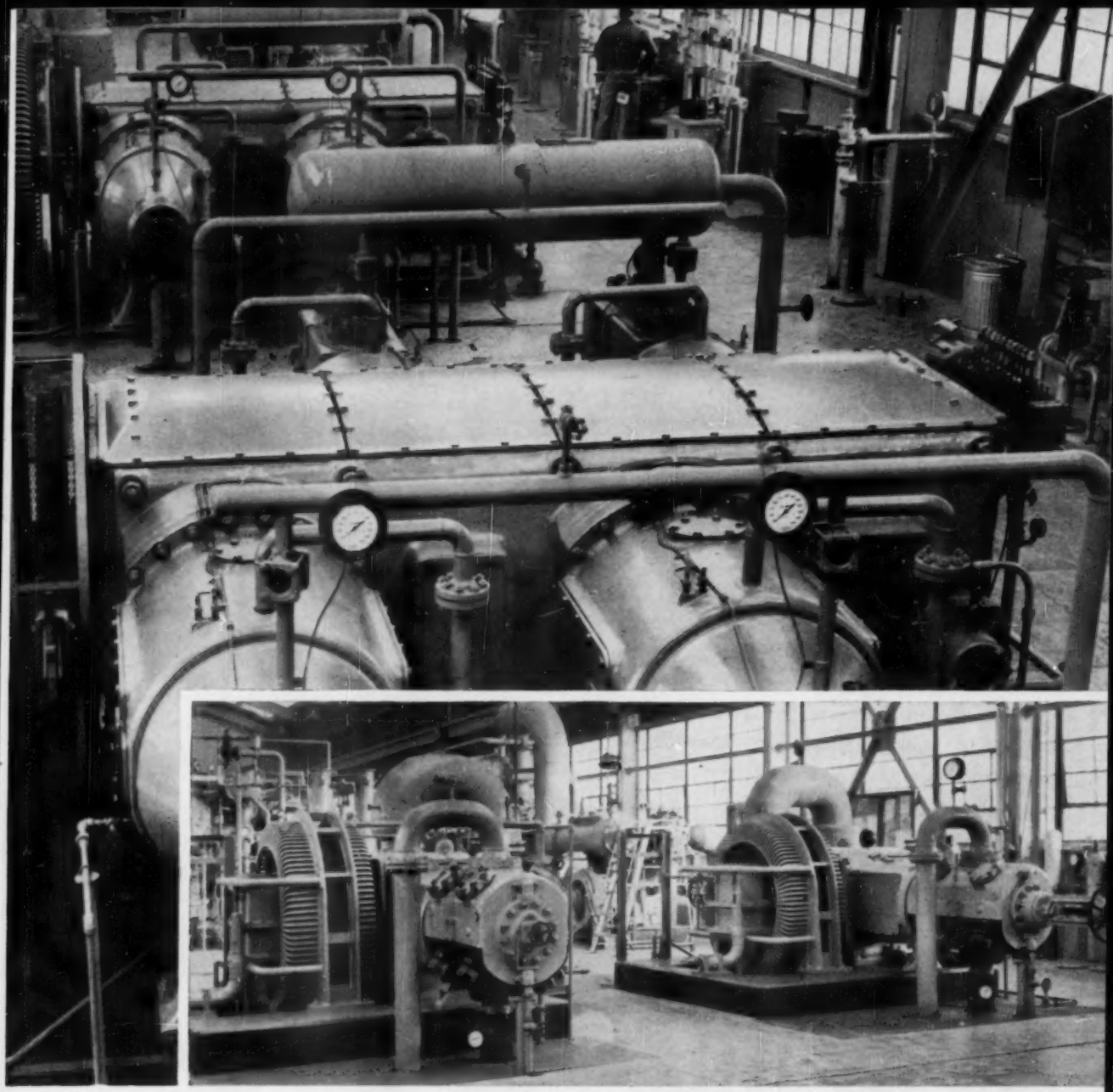

Cooper-Bessemer 2-cylinder FM's compressing ammonia at the Tuscola plant of U. S. Industrial Chemical.

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SIGNAL OIL & GAS CO., 811 West Seventh Street, Los Angeles 17.

• Signal is one of a four-company group awarded 27,600-acre Lot 4 in Lake Maracaibo and 98,800 acres on the Colombian border by Venezuela. It has an interest in Guatemalan concessions, and has interest in Middle East production through 15.08 per cent interest in American Independent Oil Co. and one-twelfth of 5 per cent in Iranian Oil Participants, Ltd.

Officers: S. B. Mosher, pres.; R. H. Green, exec. v.p.; G. L. Young, v.p. foreign; O. W. March, v.p.; R. W. Heath, v.p.; J. H. Marshall, v.p.; H. F. Clary, v.p.

SINCLAIR OIL CORP., 600 Fifth Avenue, New York 20.

• Venezuela is the chief area of Sinclair's foreign operations. A 96.2 per cent owned subsidiary, Venezuelan Petroleum Co., produced 23,700 bbl. daily the first 7 months of the year, and a new, jointly owned 212-mile crude pipeline to Porto Cabello is opening Barinas production.

In East Africa, Sinclair holds half interest in a 59,000,000-acre concession in Somalia. It also owns about 31 per cent interest in Richfield Oil Corp., which is engaged in several foreign exploration programs.

Officers: P. C. Spencer, pres.; M. L. Gosney, chair. of bd. and of exec. comm.; H. Jeffries and E. L. Steiniger, exec. v.p.'s; vice presidents: W. F. Dau, treas.; C. J. Allen, F. A. Bush, C. G. Drescher, J. E. Dyer, H. D. Moore, E. H. Mutz, Millard E. Stone, O. P. Thomas, I. J. Bergholt.

SOC. ANON. PETROLERA LAS MERCEDES, Apartado 267, Texpet, Caracas.

• Mercedes is an exploration, production, and pipeline company in Venezuela. It averaged 25,700 bbl. daily the first 7 months of the year. It is owned jointly by Caracas Petroleum, S.A., a wholly owned subsidiary of Ultramar Co., Ltd., and The Texas Co.

Officers: R. E. Wright, pres.; D. W. Ross, v.p.

SOCONY MOBIL OIL CO., INC., 150 East Forty-second Street, New York 17.

• Socony is one of the major international oil companies, operating directly or through affiliates in all major free-world producing areas.

Total gross crude production last year averaged 675,000 bbl. daily, of which 60 per cent came from the Western Hemisphere and 40 per cent from the Eastern Hemisphere. Socony produced 95,500 bbl. daily in Venezuela, and had 12,900 bbl. daily in Colombia through 50 per cent owned Colombian Petroleum Co.

The company averaged 225,900 bbl. daily in the Middle East through 10 per cent interest in Arabian American Oil Co., 12⅞ per cent in Iraq Petroleum Co., Ltd., and 7 per cent in Iranian Oil Participants, Ltd.

It also has half interest in Standard-Vacuum Oil Co., which has integrated operations in South Africa, the Far East, and Australia.

Affiliates produce crude in West Germany, Austria, and Egypt. The company has concessions or licenses in Libya, Nigeria, Turkey, Portugal, France, as well as in several countries through its interest in Stanvac.

World-wide refinery runs to Socony's account averaged 859,000 bbl. daily, of which 295,000 bbl. daily was processed abroad. This included 144,000 bbl. daily at six European plants, and a share of runs in 10 other plants elsewhere in the Eastern Hemisphere.

Product sales averaged 952,000 bbl. daily, of which 334,000 bbl. daily was marketed abroad.

Officers: B. Brewster Jennings, chair.; Albert L. Nickerson, pres.; vice presidents: Fred W. Bartlett, Paul V. Keyser, Jr., John F. Seal, Clark S. Teitsworth, and Herbert Willetts.

SOUTH AMERICAN GULF OIL CO., Aereo 3434, Bogota, Colombia.

• Operates a 260-mile, 12-in. pipeline from Barco concession to Covenas on Colombia's Atlantic Coast. Jointly owned by The Texas Co. and Socony Mobil Oil Co., Inc.

Officers: F. H. Wilcox, pres.; J. L. Bower, exec. v.p.

STANDARD OIL CO. OF CALIFORNIA, 225 Bush Street, San Francisco.

• Socal is a major international company, active directly or indirectly in all phases of the oil business in most of the free world. Gross crude and condensate production last year averaged 808,494 bbl. daily. Runs to stills to its account were 754,000 bbl. daily, and product sales 758,000 bbl. daily. Nearly half the crude production came from the Middle East and Indonesia. Nearly one-third of the refining and sales took place in the Eastern Hemisphere.

Widespread exploration is under way in Latin America, including Guatemala. Richmond Exploration Co., the chief operating subsidiary in South America, produces more than 90,000 bbl. daily in Venezuela.

Middle East producing and refining interests are held through 30 per cent ownership of Arabian Oil Co. and 7 per cent of Iranian Oil Participants, Ltd. Socal has half interest in Bahrain operations through half interest in the Caltex group, which includes Bahrain Petroleum Co.

Caltex does business in 70 countries of the Eastern Hemisphere, has 15 refineries, and is Indonesia's leading crude producer. An exploration affiliate, American Overseas Petroleum, Ltd., has acreage in Australia, France, Libya, Turkey, and the Philippines.

Officers: R. G. Follis, chair.; T. S. Peterson, pres.; vice presidents: Hillyer Brown, dir.; G. A. Davidson, dir.; T. L. Lenzen, dir.; Gage Lund, dir.; E. J. McClanahan, dir.; G. L. Parkhurst, dir.; W. H. Beekhuis, K. H. Crandall, W. W. Davison, P. L. Fahrney, F. M. Jayne, O. N. Miller, G. J. O'Brien, E. R. Peterson, J. E. Toussaint, and H. G. Vesper.

STANDARD OIL CO. (IND.), 910 South Michigan, Chicago 80.

• Stanolind has an interest in Venezuelan concessions through its subsidiary, Pan Venezuelan Oil Co. This includes one-third interest in 24,858-acre Lot 12 in Lake Maracaibo, entire interest in 22,260-acre Lot 7 in the Gulf of Paria, and several blocks along the Colombian border. It also has half interest in 15,000,000 acres in Cuba, and 75 per cent in 5,500,000 acres in Jamaica.

Officers: R. E. Wilson, chair.; F. O. Prior, pres.; John E. Swearingen, exec. v.p.; vice presidents: S. A. Montgomery, Joseph K. Roberts, Thomas E. Sunderland, Dwight F. Benton.

STANDARD OIL CO. (N. J.), 30 Rockefeller Plaza, New York.

• Jersey Standard through wholly or partially owned affiliates is the world's largest oil company in terms of production, refining, and product sales. Last year, its gross world-wide crude production averaged 2,328,000 bbl. daily, refinery runs 2,449,000 bbl. daily, and product sales, 2,607,000 bbl. daily. In anticipation of continuing gains in world demand, the company earmarked $1,250,000,000 this year for capital equipment and oil and gas exploration.

The company's affiliates carry on integrated operations in all parts of the free world. Its chief single source of crude is the 95 per cent owned Creole Petroleum Corp. which grossed 1,081,000 bbl. daily last year. Another Latin American affiliate, 83 per cent owned International Petroleum Co., operating in Colombia and Peru, and with an option on 25 per cent of Mene Grande Oil Co. output, averaged 123,000 bbl. daily. These two affiliates accounted for nearly 52 per cent of Jersey's total crude production.

The Middle East was the second most important source of foreign crude. The company had available 430,000 bbl. daily through its 30 per cent interest in Arabian American Oil Co., 12⅞ per cent interest Iraq Petroleum Co., Ltd., group, and 7 per cent in Iranian Oil Participants, Ltd.

Jersey is also 50 per cent owner of Standard-Vacuum Oil Co. which carries on integrated operations in Africa, the Far East, and Australia.

The company also has an interest in crude production in France, Netherlands, and West Germany. It recently expanded its exploration activities to Libya, Turkey, and Guatemala where it acquired large concession blocks in competitive bidding.

By and large, the company has refining interests near its major producing and marketing areas. Latin American refineries accounted for 34 per cent of total runs to stills last year, and Eastern Hemisphere refineries, 21 per cent. The biggest individual refinery is operated by Lago Oil & Transport Co., Ltd., at Aruba, Netherlands Antilles. Runs averaged 439,000 bbl. daily.

Officers: Eugene Holman, chair.; M. J. Rathbone, pres.; vice presidents: Hines Baker, S. P. Coleman, L. W. Elliott, H. H. Hewetson, E. E. Soubry, Leo D. Welch.

STANDARD OIL CO. (OHIO), Midland Building, Cleveland 15.

• Sohio is one of a four-company group holding the 27,600-acre Lot 4 in Venezuela's Lake Maracaibo. It also has one-third interest in a 1,232,000-acre concession in Bolivia, and holds concessions in Guatemala in which other companies participate. It has one-twelfth of 5 per cent interest in Iranian Oil Participants, Ltd.

Officers: C. T. Foster, pres.; E. B. McConnell, v.p.; R. C. Sauer, v.p.; A. E. Wolf, v.p.

STANDARD-VACUUM OIL CO., 1000 Westchester Avenue, White Plains, N. Y.

• Stanvac is a jointly owned subsidiary of Socony Mobil Oil Co., Inc., and Standard Oil Co. (N. J.). It engages in integrated operations in about 50 countries in Africa, Far East, and Australasia.

Its main source of crude is Sumatra, where output averages about 70,000 bbl. daily. Exploration programs are under way in Pakistan, India, British Somaliland, Australia, Indonesia, Papua, Netherlands New Guinea, and the Philippines.

Refineries located in India, Union of South Africa, Indonesia, Japan, and Australia, have a capacity of 180,000 bbl. daily.

Officers: L. V. Collings, chair.; H. F. Prioleau, pres.; vice presidents, E. N. Lei-

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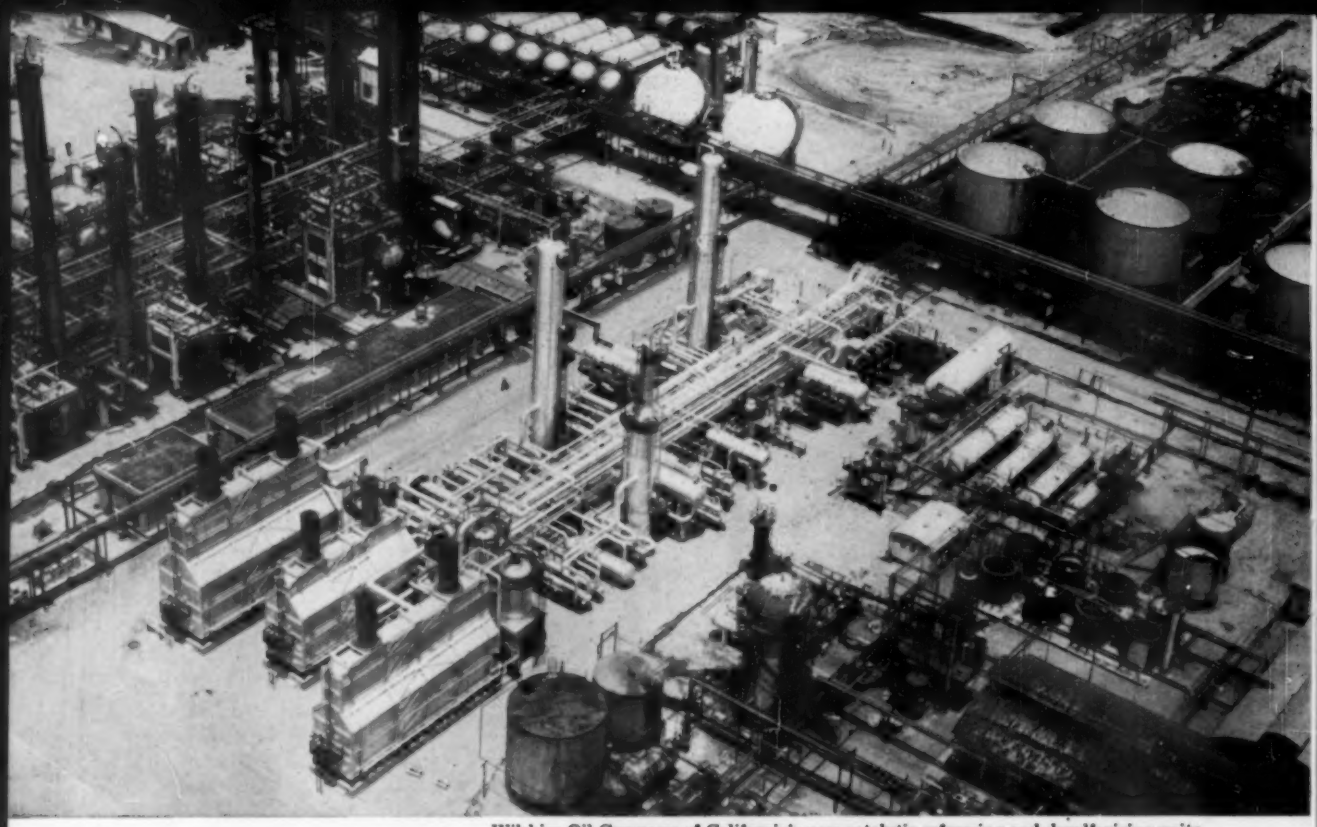

Wilshire Oil Company of California's new catalytic reforming and desulfurizing units at Norwalk, designed and constructed by SWECO to produce high-octane motor fuel.

Teamed to Upgrade Lowgrade

Working together, Wilshire Oil Co. of California and SWECO have been solving process problems since 1923. They've done it again with this new 10,000 BPD Platformer-Unifiner for premium-quality gasoline.

To help satisfy the growing thirst of modern auto engines for higher octane fuels, Wilshire Oil Co. of California decided to add a new catalytic reforming unit at its Norwalk plant. Design and construction were placed in the hands of SWECO's Engineering and Construction Division. A logical choice. The two companies have been working together since 1923, when SWECO built an absorption plant for Wilshire at Santa Fe Springs. And for 34 years, SWECO had been supplying Wilshire with heat exchangers and other process equipment. SWECO was a known *dependable* quantity.

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Approximately 13 months after SWECO engineers went to work, the Norwalk unit went "on stream." (Total elapsed time included 7 months of field construction.) It's a typical SWECO job. Done right, and done right on time, whether it's in Tanganyika, the Andes, or around the corner in Norwalk, California.

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bacher, C. B. Marshall, H. W. McCobb, J. C. Sample.

SUN OIL CO., 1608 Walnut Street, Philadelphia 3.

• Sun has actively engaged in acquiring prospective foreign properties through its new foreign operations department. In Venezuela, a subsidiary has 45 per cent interest in two concessions covering 27,000 acres in Lake Maracaibo and in a 25,000-acre tract along the southern border of the country. Other subsidiaries have concession interests in Guatemala, the Bahamas, and Colombia, and are negotiating for rights in Pakistan.

Officers: Joseph N. Pew, Jr., chair.; Robert G. Dunlop, pres.; vice presidents: Clarence H. Thayer, Frank R. Markley, Jno. G. Pew.

SUNRAY MID-CONTINENT OIL CO., Sunray Building, Tulsa 2.

• Sunray has Venezuelan interests through 17.27 per cent ownership in Block 17, and 5 per cent in Block 10 in Lake Maracaibo. Each concession covers 24,710 acres. The company has a small interest in the Middle East through 2.65 per cent interest in American Independent Oil Co.

Officers: C. H. Wright, chair.; W. C. Whaley, pres.

SUPERIOR OIL CO., 601 West Fifth Street, Los Angeles 17.

• Has sole ownership of a concession over a 7,774-acre block of national reserve acreage in Venezuela's Lake Maracaibo, on which it has brought in two wells of major promise. Also has 24,700-acre block on the Colombian border.

Officers: W. M. Keck, chair.; H. B. Keck, pres.; J. C. Cody, v.p.; S. F. Magor, v.p.; S. H. Durkee, v.p.

TEIKOKU OIL CO., LTD., 317 Higashi-Okubo 2-chome, Shinjuku-ku, Tokyo, Japan.

• A private Japanese company producing about 6,000 bbl. daily from established fields. It has 25 per cent interest in Japan Petroleum Exploration Co., which is searching for oil in new areas.

TEXAS GULF PRODUCING CO., 1347 Mellie Esperson Building, Houston 2.

• Holds 80 per cent interest in Ganso Azul Cia. de Petroleo, which operates Agua Caliente field in eastern Peru. A subsidiary, Libyan American Oil Co., is carrying on an exploration program in Libya. W. R. Grave & Co. has 49 per cent interest in the Libyan venture.

Officers: G. W. Reed, chair.; L. S. Reed, pres.

THE TEXAS CO., 135 East Forty-second Street, New York 17.

• The Texas Co. is one of the international majors with integrated operations in the United States and most other countries of the free world. Gross crude production last year averaged 970,300 bbl. daily, refinery runs, 975,900 bbl. daily, and product sales, 983,600 bbl. daily.

The company operates directly or through subsidiaries in the Western Hemisphere and West Africa. Its share of production in Colombia and Venezuela was about 58,000 bbl. daily. The Trinidad Oil Co., acquired last year, produced about 28,000 bbl. daily. The parent company's chief operating subsidiary in other Latin American and West African areas is Texas Petroleum Co., which carries on integrated operations, except marketing.

The parent's subsidiaries have comparatively small refineries in Colombia and Venezuela, and a new 20,000-bbl.-daily plant in Cuba. Trinidad Oil has a 80,000-bbl.-daily refinery at Pointe-a-Pierre.

The company has an interest in Middle East production and refining through 30 per cent ownership in Arabian American Oil Co. and 7 per cent in Iranian Oil Participants, Ltd. It has half interest in Bahrain production and refining through 50 per cent interest in the Caltex group of companies, which includes Bahrain Petroleum Co., Ltd.

The Caltex group does business in 70 Eastern Hemisphere countries. It has 15 refineries and is the leading crude producer in Indonesia. An exploration affiliate, American Overseas Petroleum, Ltd., is working in Australia, France, Libya, Turkey, and the Philippines.

Officers: A. C. Long, chair.; J. W. Foley, pres.; senior v.p.'s: C. B. Barrett, E. R. Filley, T. A. Mangelsdorf, J. T. Wood, Jr.; vice presidents: S. C. Bartlett, J. B. Christian, S. T. Crossland, treas.; F. M. Dawson, H. T. Dodge, O. J. Dorwin, gen. coun.; Robert Fisher, F. H. Holmes, L. C. Kemp, Jr., A. N. Lilley, J. H. Pipkin, J. H. Rambin, Jr., J. S. Worden.

TEXAS PETROLEUM CO., 135 East Forty-second Street, New York 17.

• This wholly owned subsidiary of The Texas Co. engages in integrated activities except marketing in Central and South America, and in West Africa. It produced 43,700 bbl. daily the first 7 months of the year in Venezuela and has additional output in Colombia. Its refining interests include one-third ownership in the 59,000-bbl.-daily plant of Venezuela Gulf Refining Co. at Puerto la Cruz.

Officers: H. T. Dodge, pres.; vice presidents: R. H. Aitken, A. W. Baucum, G. B. Butcher, E. L. Gorham, Jr., H. M. Hanbury, J. V. C. Malcolmson.

TIDEWATER OIL CO., 17 Battery Place, New York 4.

• Foreign activities include concession interests in Guatemala and Turkey. One-twelfth of 5 per cent is held in Iranian Oil Participants, Ltd.

Officers: D. T. Staples, pres.; L. F. Bayer, sen. v.p.; vice presidents: C. R. Brown, George F. Getty II, H. B. Haney, H. Y. Hyde, E. B. Miller, Jr., J. E. Roth, T. L. Wark, J. R. Getty.

TRANS-ARABIAN PIPE LINE CO., Beirut, Lebanon.

• Tapline operates a 754-mile, 30-31-in. crude pipeline from Qaisumah, Saudi Arabia, to Sidon, Lebanon, on the Mediterranean Coast. The line transports Saudi Arabian crude delivered to Qaisumah through a 315-mile pipeline operated by Arabian American Oil Co. during the first 9 months of this year deliveries at Sidon averaged 338,700 bbl. daily. Ownership is same as Aramco.

Officers: R. G. Follis, chair.; John Noble, pres. and chief exec. officer.

TRINIDAD NORTHERN AREAS, Pointe-a-Pierre, Trinidad.

• Holds onshore and offshore concessions in Trinidad and is developing Soldado field in the Gulf of Paria. Joint owners are BP Exploration Co., Ltd., Shell Trinidad, Ltd., and Trinidad Oil Co., Ltd.

TRINIDAD OIL CO., LTD., Pointe-a-Pierre, Trinidad.

• A 99 per cent owned subsidiary of The Texas Co. with integrated operations in Trinidad. Produces about 28,000 bbl. daily by itself and through one-third interest in Trinidad Northern Areas, working in the Gulf of Paria.

Officers: J. B. Christian, chair. and man. dir.; W. W. Watson, sec.

TRINIDAD PETROLEUM DEVELOPMENT CO., LTD., 36-37 King Street, Cheapside, London, E. C. 2.

• A producing company in Trinidad, purchased late yast year by British Petroleum Co., Ltd. Output is more than 11,000 bbl. daily.

TURKISH PETROLEUM CORP., Kizilay Istas Ap. 6-1, Yenisehir, Ankara, Turkey.

• Turkiye Petrolleri is a domestic company engaged in exploration, production, transportation, and refining. It is 51 per cent owned by the Turkish Government. Its properties include a 7,360-bbl.-daily refinery at Batman, supplied by nearby Garzan and Raman field.

UNION OIL CO. OF CALIFORNIA, 617 West 7th Street, Los Angeles 17.

• Has an exclusive concession over provinces of Limon and Guanacaste in Costa Rica and holds a block in Panama on the Costa Rican border. It also has concessions in Guatemala, and holds 15 per cent interest in a 1,967-acre national reserve block V-575 in Lake Maracaibo.

Officers: R. H. Taylor, chair.; A. C. Rubel, pres.; S. Grinsfelder, v.p., explor.; D. Tower, v.p., prod.

VENEZUELAN PETROLEUM CO., 600 Fifth Avenue, New York 20.

• The operating subsidiary of Sinclair Oil Corp. in Venezuela. Output first 7 months this year averaged 23,700 bbl. daily. A 35,000-bbl.-daily refinery is located at Puerto la Cruz.

Officers: H. M. Russel, pres.; W. C. Paton, v.p.; I. J. Bergholt, v.p.

YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS (YPFB), Casilla 401, Av. Camacho, La Paz, Bolivia.

• YPFB is the oil administration of the Bolivian Government. It produces about 9,600 bbl. daily, has two refineries and two topping plants with a total capacity of 11,700 bbl. daily, and operates crude and products pipelines. Under Bolivia's new oil law, extensive areas were reserved to YPFB, which has made an exploration agreement with Gulf Oil Corp. over much of this acreage.

Officers: E. Hinojosa Acha, gen. man.

YACIMIENTOS PETROLIFEROS FISCALES (YPF), Buenos Aires, Argentina.

• YPF is the Argentine Government's state oil agency, handling most crude production, transportation, and refining. Output was over 90,000 bbl. daily in peak months earlier this year, reflecting expansion efforts. Extensive pipeline and other facilities are being added through contracts let to foreign firms.

YEMAN DEVELOPMENT CARP., 7 West Fifty-first Street, New York.

• Has a concession for a 40,000-sq.-mile area of northern Yeman. Company owners are George E. Allen and other American interests.

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Long life is built into every AXELSON sucker rod by precise control of *time* and *temperature* in heat treating. This careful handling of selected steel results in uniform grain structure from end to end, and the best combination of strength, ductility and shock resistance – all adding up to maximum sucker rod life.

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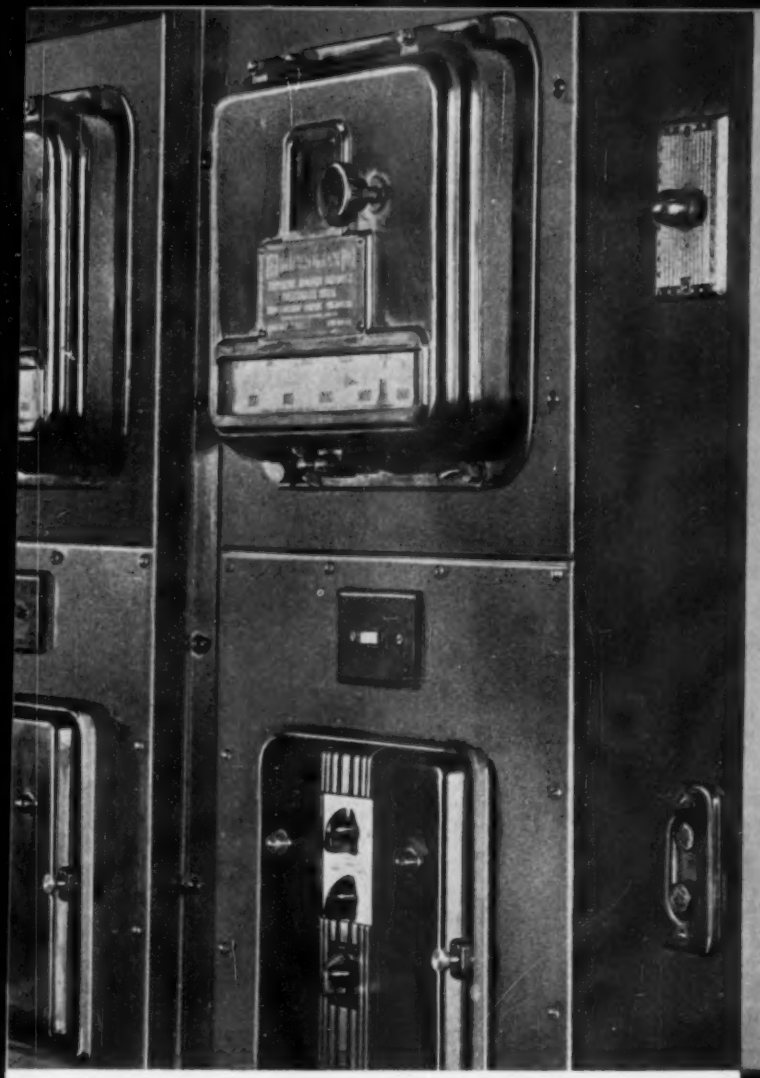

Nerve center of the heat treatment process *is the master control panel. Two recording charts plot the heat pattern inside the mammoth furnace from 9 indicating thermocouples. Twelve electronic controllers operate the valves of the 64 burners to provide complete control of heat in every part of the furnace.*

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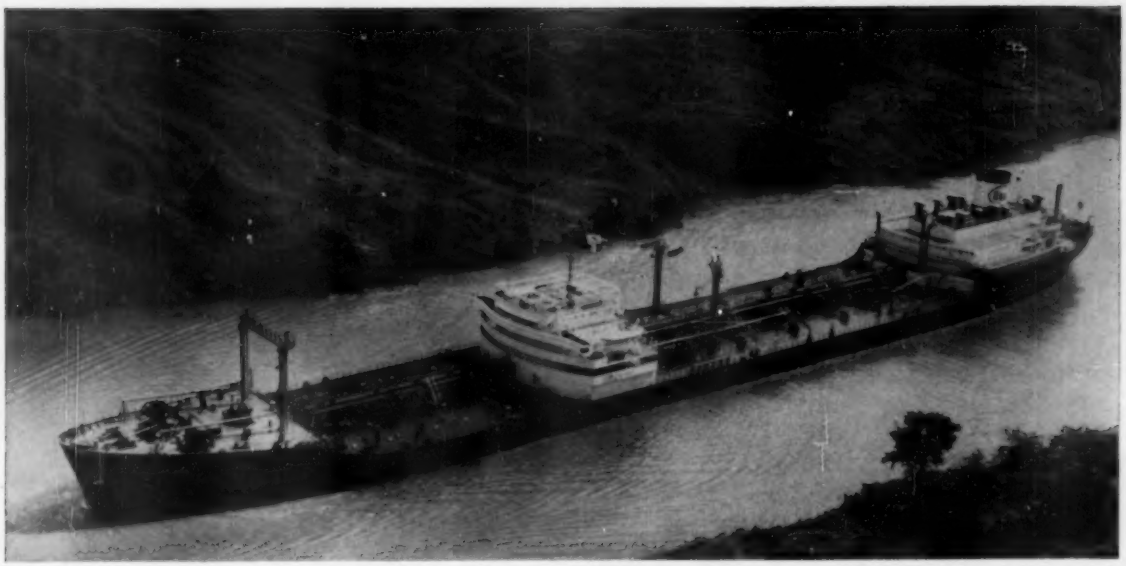

DRAWING 25 ft. in the fresh water of Gaillard Cut, the Esso Columbia, 35,521 d.w. tons, moves cautiously during her transit of the Panama Canal.

Tanker-Building Boom is breaking

all previous records as tonnage now on order hits 40 million deadweight tons. Suez closing touched it off

By John J. Winterbottom
Coordinator of Transportation
Standard Oil Co. (N. J.)

A MASTERPIECE of understatement was made by this author 1 year ago when, in preparing a similar article for the Journal's 1956 International Number, he stated that "marine-transportation planners would be busy for some time to come!" Busy they have been, all right — the tanker-building boom has broken all past records, and in the year since the closing of the Suez Canal in late October 1956, the amount of tanker tonnage on order and under construction by oil companies and independent tanker owners has nearly doubled to a level of about 40,000,000 d.w. tons. This represents by far the largest backlog in history, and if these tankers are actually built and utilized, the present free-world fleet will be doubled in size. It is not surprising, therefore, that the forecast in Table 1, based on today's planned buildings and assuming a continued growth in free-world oil demand, indicates a surplus of tonnage over needs for the next several years. As will be emphasized later, however, this surplus could "evaporate" by order cancellations, higher-than-normal scrappage, or an upsurge in free-world oil-demand growth.

This is our fifth article in the Journal on the same general subject since 1952. Future surpluses that were predicted in 1952 and 1953 became a reality, and over 1953 and 1954 there was an average of nearly 100 T-2 equivalents of tonnage in tieup. During 1955, however, the charter market strengthened due to a higher-than-anticipated growth in free-world oil demand and vessels were brought out of tieup rapidly. By year end 1955, vessels in tieup had all but disappeared.

TABLE 1—POTENTIAL WORLD TANKER POSITIONS
(Assuming all planned new buildings materialize)

	T-2 Equivalents—year end			
	1957	1958	1959	1960
Est. tonnage requirements (after programed increases in Middle East pipeline capacities)	2,515	2,620	2,820	2,980
Est. potential tonnage availability*	2,615	2,915	3,255	3,530
Potential theoretical surplus	100	295	435	550
*Memorandum on availability:				
New construction		350	360	325
Normal obsolescence		50	20	50
Net addition to fleet		300	340	275

The market remained strong with essentially all operable vessels being utilized until the spring of 1957.

The upsurge in oil demand and resulting strong tanker market that developed in 1955 is a good example of how predicted surpluses can evaporate—i.e., the forecast of surpluses in our December 1954 article. It is now apparent that industry as a whole did not then anticipate the extent of growth in requirements as tanker-building plans did not keep pace with demand for the 1955-56 period. Our article of a year ago predicted a surplus for year end 1957 which has now materialized. The rapid addition to the world fleet of new buildings this year, plus a tapering off of oil-demand growth has brought about today's surplus of tankers and correspondingly weak charter market. Industry's building program, further stimulated by the Suez crisis, continued to increase, until as of October 1, 1957, approximately 40,000,000 d.w. tons were on order compared to 9,000,000 in mid-1955.

Last year's article stressed that predictions of future long or short industry tonnage positions are subject to wide swings, due to only modest deviations in each component of the tonnage supply-demand balance. It is of interest to examine further some of the major factors which can cause wide swings in forecasted industry tonnage positions. To do this, the two major elements involved in predicting tonnage positions—tonnage requirements and availability—will be discussed separately.

TABLE 2

	Free World oil demand—1,000 bbl. per day	Free World oil demand—Annual incr. (per cent)	Tonnage utilization—T-2 Equivalents	Tonnage utilization—Annual incr. (per cent)
1950	10,060	....	1,217	....
1951	11,140	10.7	1,355	11.3
1952	11,660	4.7	1,492	10.1
1953	12,340	5.8	1,611	8.0
1954	13,050	5.8	1,751	8.7
1955	14,490	11.0	2,011	14.9
1956	15,570	7.4	2,227	10.7
Average increase, per cent per year: 1950 to 1956		7.5		10.6

Tonnage Requirements Controlling

Marine-transportation planners must first estimate the need for tankers in order to determine the extent of their tanker-building program. The principal items affecting these tonnage requirements are:

1. World oil demand—i.e., general economic climate.
2. Supply sources and demand locations—i.e., tanker supply routes.
3. Suez Canal and major pipeline capacities.

Historical trends in requirements . . . Table 2 illustrates items (1) and (2)

TABLE 3—WORLD TANKER TONNAGE AS OF OCTOBER 1, 1957

	U.S. flag No.	U.S. flag D.w. tons	U.S. flag T-2 equiv.	Foreign flag No.	Foreign flag D.w. tons	Foreign flag T-2 equiv.	Total world No.	Total world D.w. tons	Total world T-2 equiv.
6,000-16,000	45	559,073	31.5	802	9,965,402	495.4	847	10,524,475	526.9
16,001-20,000	229	3,856,243	236.7	863	14,986,475	892.8*	1,092	18,842,718	1,129.5
20,001-30,000	33	857,300	57.5	299	7,369,323	460.4	332	8,226,623	517.9
30,001-40,000	14	448,103	31.3	157	5,230,267	348.5	171	5,678,370	379.8
40,001-50,000	....	.....	.....	27	1,163,544	78.7	27	1,163,544	78.7
50,001-60,000	....	.....	.....	4	215,496	14.6	4	215,496	14.6
Over 60,000	....	.....	.....	3	255,760	15.3	3	255,760	15.3
Total	321	5,720,719	357.0	2,155	39,186,267	2,305.7	2,476	44,906,986	2,662.7

Note: World tanker tonnage 6,000 d.w. tons and over, excluding military and USSR.

TABLE 4—TANKERS REPORTED UNDER CONSTRUCTION OR ON ORDER OCTOBER 1, 1957

Yards—	No.	D.w. tons	T-2 equiv.	Contract delivery dates T-2 equivalent: 1957	1958	1959	1960	1961	1962	1963	1964	1965	Unknown
United States	81	3,268,200	229.7	10.7	71.1	82.5	50.6	9.4	....	....	....	....	5.4
British	218	6,489,730	436.5	41.5	89.1	73.0	71.1	52.2	13.5	31.6	8.4	....	56.1
Canadian	3	86,150	5.8	0.4	....	2.7	2.7	....	....	....	....	....	....
Swedish	177	5,543,750	372.9	19.4	49.8	60.8	69.3	70.5	32.9	22.5	2.7	....	45.0
Norwegian	89	2,316,500	155.8	2.7	17.4	12.9	29.6	17.8	27.0	17.7	13.3	13.0	4.4
Danish	28	717,700	48.3	3.3	12.0	11.3	7.0	5.8	6.9	....	....	....	2.0
French	67	2,728,073	183.5	15.0	28.4	21.7	33.6	35.9	23.9	....	....	....	25.0
Spanish	38	833,160	56.0	5.5	1.3	4.7	3.4	....	....	....	....	....	41.1
Netherlands	88	2,546,770	171.3	12.3	28.7	24.6	35.6	26.4	10.1	15.1	4.3	....	14.2
Italian	65	2,237,256	150.5	8.2	24.1	43.8	27.8	28.3	8.7	....	....	....	9.6
Belgium	21	537,330	36.1	4.9	9.8	7.2	9.6	4.6	....	....	....	....	....
Japanese	174	7,081,628	476.3	47.4	127.9	117.3	63.7	35.0	....	....	....	....	85.0
German	117	4,104,430	276.0	7.7	48.0	40.0	55.1	44.3	23.8	9.5	9.6	....	38.0
Portuguese	2	43,700	2.9	1.1	....	....	....	1.8	....	....	....	....	....
Yugoslavia	5	113,200	7.6	....	....	6.3	1.3	....	....	....	....	....	....
Greek	6	147,500	9.9	....	....	....	5.0	4.9	....	....	....	....	....
Total	1,179	38,795,077	2,619.1	180.1	507.6	508.8	465.4	336.9	146.8	96.4	38.3	13.0	325.8
Yards or owners unknown*	32	1,098,400	73.8										
Total	1,211	39,893,477	2,692.9										

*The following contracts have been reported as placed; however, actual yards or owners are unknown.

Yard—	No.	D.w. tons	T-2 equiv.	Yard—	No.	D.w. tons	T-2 equiv.	Yard—	No.	D.w. tons	T-2 equiv.
British	1	18,500	1.2	Netherlands	7	216,000	14.5	Belgium	2	48,600	3.3
Norwegian	1	19,000	1.3	Italian	1	19,200	1.3	Swedish	4	96,800	6.5
Danish	1	60,000	4.0	German	15	620,300	41.7	Total	32	1,098,400	73.8

THE CASE OF
THE IDEA THAT SAVED TWO DAYS
...I'M GOING TO LOSE ABOUT TWO DAYS WHILE WE REBUILD THAT FLYWHEEL CLUTCH!
WHY SHOULD YOU? PUT IN A REBUILT ASSEMBLY FROM OUR EXCHANGE STOCK AND YOU'LL HAVE YOUR TRACTOR GOING THIS AFTERNOON!
CAT
IS IT EXPENSIVE?
NOT AT ALL...
--YOU PAY ONLY FOR THE PARTS AND REPAIR SERVICE TO PUT YOUR CLUTCH IN THE SAME FIRST-CLASS SHAPE AS THE EXCHANGE UNIT. THEN YOUR REBUILT ASSEMBLY GOES INTO OUR EXCHANGE STOCK.
EXCELLENT IDEA! GO AHEAD...
THAT AFTERNOON
SURE AM GLAD I FOUND OUT ABOUT YOUR PARTS ASSEMBLY EXCHANGE PLAN, ART!
WE HAVE OTHER ASSEMBLIES ON HAND TOO, JIM. IT'S AN IDEA THAT REALLY SHORTENS DOWN TIME!
CATERPILLAR*
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.
CAT CARE FOR LONGER WEAR
LET ME HELP KEEP YOUR CAT* EQUIPMENT ON THE JOB!
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

above, comparing the growth in oil demand with tonnage required (6,000 d.w. tons and over) to move that portion of the demand requiring ocean transportation for the period 1950 through 1956. The proportionately greater growth rate of the tonnage utilization, or requirements, is apparent, averaging 10.6 per cent against 7.5 per cent per year for world oil demand for 1950-1956. The most significant factor in the increase of tonnage requirements relative to total oil demand is the rapid growth of Middle East supplies which require longer hauls to Europe and North America compared to the previous main source of supplies (Caribbean area). The rapid growth of Europe's oil demand contributed substantially to this effect.

Free foreign area growths in oil demand have a more significant effect on ocean-tonnage requirements than oil-demand growths in the United States. Over 70 per cent of the free foreign demand requires ocean-tanker transportation compared to only about 35 per cent of the over-all United States demand (including imports). In addition, the average foreign haul is over twice as long as that pertaining to the U. S. demand.

As pointed out in last year's article, none of these observations regarding past trends is hard and fast. A good example of drastic changes in world supply routes were those brought about by the oil industry during the Suez crisis in order to supply Europe's oil needs. Before the emergency, approximately 2,350,000 bbl. a day of oil was moving from the Middle East west to Europe, North and West Africa, and North America (about 850,000 bbl. per day from the eastern Mediterranean and 1,500,000 through the Suez Canal). During the Suez closure, only Tapline's 350,000 bbl. per day was available in the eastern Mediterranean, since the IPC line was shut down. Europe was adequately supplied, however, by making available enough Western Hemisphere supplies which would, due to the shorter haul, still leave enough ships in the free-world fleet to balance Europe's needs from the Persian Gulf via the Cape of Good Hope. Thus, approximately the same world oil demand was supplied with the same tankers by revising supply routes.

Forecasted tonnage requirements . . . The potential surpluses shown through 1960 assume a growth in world oil demand of a little less than 6 per cent per year. The projected supply patterns still result in annual growth rates for ocean-tanker requirements greater than those for the total oil demand. Normal operations of all existing Middle East pipeline systems and the Suez Canal are assumed. Programed increases in pipeline throughputs are also reflected during the forecast period. No brand-new pipelines are included.

Possible trends in future tonnage needs . . . There are some indications of the greater growth in tonnage utilization relative to total oil demand (note Table 2) leveling off in the future. In fact, the trend could be reversed. Items which could cause this include:

1. Greater Middle East pipeline capacities than forecasted.
2. Rapid development of North African oil.
3. More crude production in Europe.
4. A trans-European pipeline.

A significant item working in the opposite direction would be any tendency towards future movements of Persian Gulf supplies to Europe and North America via the Cape of Good Hope in large efficient tankers built for this purpose.

Tonnage Availability

The second major element used in forecasting future industry tonnage positions is tonnage availability. This potential future world tanker fleet depends primarily on (1) today's fleet, (2) new tanker buildings, and (3) obsolescence or scrapping rate of existing fleet.

Today's fleet . . . Table 3 shows the world commercial tanker fleet as of October 1, 1957. The 2,476 vessels total 44,906,986 d.w. tons and are equivalent to 2,663 T-2 tankers. The T-2 equivalent, used throughout the industry as a convenient tool for measuring tonnage requirements, represents the capacity of the 16,600-d.w. ton, 14.5-knot tanker built in large numbers in the United States during World War II. The average vessel in the world fleet continues to increase in size and is now about 18,000 d.w. tons, an increase from last year when the average vessel was a T-2.

New tankers reported under construction or on order as of October 1, 1957, are listed in Table 4 by country of building and by contract delivery dates. Over 240 T-2 equivalents of new construction were delivered in the 9 months ending October 1 this year, and although it is certain that a number of the remaining deliveries indicated for 1957 will slip into 1958, the total new additions this year should exceed 300 T-2 equivalents. The potential tonnage availability shown in the forecast table assume delivery rates of new tankers of 350 T-2 equivalents for 1958, 360 for 1959, and 325 for 1960. These assumptions assume some slippage beyond the contract deliveries dates shown in Table 4, which are felt to be optimistic in that they undoubtedly reflect deliveries in some years in excess of world shipyard building capacity for tankers.

Obsolescence . . . In order to arrive at the potential future fleet, it was also necessary to make an assumption regarding the obsolescence or scrapping rate of the older vessels in today's fleet. To predict the future scrapping rate accurately would be a neat trick since this rate depends not only on the age of the vessels but also on the future charter-market levels which, in turn, depend on the future world-tanker positions. For our purposes, therefore, of determining a **potential theoretical surplus,** a nominal scrapping rate based on age was assumed.

Self-correcting aspects of tonnage availability . . . Our potential surpluses indicated for 1958, 1959, and 1960 assume that (1) all planned new buildings of tankers will materialize,

TABLE 5—WORLD TANKER CONSTRUCTION AS OF OCTOBER 1, 1957

	U. S. yards			Foreign yards			Total construction		
	No.	D.w. tons	T-2 equiv.	No.	D.w. tons	T-2 equiv.	No.	D.w. tons	T-2 equiv.
6,000-16,000	..	.....	....	41	532,150	35.7	41	532,150	35.7
16,001-20,000	1	20,000	1.3	303	5,719,340	384.5	304	5,739,340	385.8
20,001-30,000	17	470,500	33.1	153	3,753,542	252.7	170	4,224,042	285.8
30,001-40,000	28	933,950	65.6	333	11,755,941	790.9	361	12,689,891	856.5
40,001-50,000	27	1,232,250	86.1	199	9,055,054	608.8	226	10,287,304	694.9
50,001-60,000	4	240,000	17.1	11	611,250	41.0	15	851,250	58.1
Over 60,000	4	371,500	26.5	58	4,099,600	275.8	62	4,471,100	302.3
Total	81	3,268,200	229.7	1,098	35,526,877	2,389.4	1,179	38,795,077	2,619.1

and (2) the scrapping rate will be only normal.

Cancellations of orders are unlikely for 1958 deliveries since construction progress and material ordering for these early deliveries should be well advanced. However, such cancellations appear probable for 1960, and perhaps late 1959, if the current long tonnage position continues.

Earlier-than-normal scrapping will no doubt occur if prolonged tieup is forced by a continued surplus of tonnage. The introduction of large efficient tankers could certainly be a factor in this regard in causing early obsolescence of some of the surplus small inefficient vessels in the world fleet. Table 5 shows that the planned new tanker buildings continue to increase in size, 84 per cent of the tonnage being in vessels larger than 20,000 d.w. tons compared to 75 per cent last year. Today's existing fleet (Table 3), on the other hand, has only 38 per cent of its total tonnage in vessels of over 20,000 d.w. tons.

It is, therefore, entirely possible that a combination of order cancellations and earlier-than-normal scrappings could wipe out tonnage surplus by 1960 even without an upsurge in world oil demand, although a probable tied-up fleet in being at that time would act as a deterrent to any rapid charter-market rise, unless coupled with such an upsurge in demand.

The world tanker fleet including government and military vessels (300 gross tons and over basis) is shown in Table 6 by flags of registry. The British Flag Fleet is now the largest, replacing the U. S. Flag Fleet.

TABLE 6—WORLD'S TANKER TONNAGE—CLASSIFIED BY FLAG (300 GROSS TONS AND OVER) AS OF OCTOBER 1, 1957

	Vessels 6,000 d.w. tons and over							Vessels under 6,000	Grand total		
Country—	No.	Steam	No.	Motor	No.	Total	T-2 equiv.	d.w. tons	No.	D.w. tons	Per cent
United States	426	7,544,684	12	183,382	438	7,728,066	491.3	470,582	768	8,198,648	16.44
British	203	3,884,482	318	4,266,314	521	8,150,796	456.0	361,910	739	8,512,706	17.07
Canadian	11	192,441	....	.....	11	192,441	11.8	77,795	43	270,236	0.54
Norwegian	37	767,933	377	6,563,919	414	7,331,852	421.8	103,894	464	7,435,746	14.91
Italian	58	1,062,149	61	921,280	119	1,983,429	116.5	61,941	161	2,045,370	4.10
French	46	950,287	59	1,103,048	105	2,053,335	123.6	117,082	168	2,170,417	4.35
Venezuelan	12	106,288	1	17,990	13	124,278	5.8	83,541	31	207,819	0.42
Netherlands	52	910,981	49	665,219	101	1,576,200	90.7	102,438	143	1,678,638	3.37
Panamian	127	2,564,820	49	816,088	176	3,380,908	204.4	28,731	183	3,409,639	6.84
German	9	208,035	23	367,994	32	576,029	32.9	73,133	87	649,162	1.30
Argentine	16	203,349	13	194,673	29	398,022	22.1	67,957	55	465,979	0.93
Mexican	10	104,347	7	75,287	17	179,634	7.7	13,026	20	192,660	0.39
Greek	13	217,244	5	67,685	18	284,929	16.3	24,606	35	309,535	0.62
Brazilian	1	9,000	12	205,305	13	214,305	12.2	37,194	35	251,499	0.50
Spanish	4	33,039	23	271,774	27	304,813	15.9	37,010	40	341,823	0.69
Cuban	....	.....	....	.....	....	.....	.....	3,620	3	3,620	0.01
Chilian	2	34,638	....	.....	2	34,638	2.0	9,662	4	44,300	0.09
Peruvian	1	6,089	1	6,000	2	12,089	0.5	17,482	8	29,571	0.06
Russian	4	50,530	15	145,299	19	195,829	9.0	82,138	63	277,967	0.56
Danish	....	.....	54	954,961	54	954,961	56.1	4,061	61	959,022	1.92
Honduran	7	166,315	3	45,344	10	211,659	12.7	1,523	12	213,182	0.43
Portuguese	....	.....	7	99,958	7	99,958	5.6	9,283	11	109,241	0.22
Turkish	4	62,268	2	28,680	6	90,948	4.7	9,384	13	100,332	0.20
Colombian	....	.....	....	.....	....	.....	.....	5,750	2	5,750	0.01
Belgian	3	82,850	6	81,799	9	164,649	9.8	420	10	165,069	0.33
Swedish	2	56,230	96	1,588,724	98	1,644,954	96.5	34,538	138	1,679,492	3.37
Finnish	1	11,350	15	215,280	16	226,630	11.9	2,263	18	228,893	0.46
Yugoslavian	....	.....	3	34,710	3	34,710	1.7	5,194	5	39,904	0.08
Ecuadorian	....	.....	....	.....	....	.....	.....	2,439	2	2,439	0.00
Uruguay	2	33,224	....	.....	2	33,224	2.0	3,992	5	37,216	0.07
Chinese	2	43,602	2	24,628	4	68,230	3.6	17,284	17	85,514	0.17
Polish	1	12,020	2	22,991	3	35,011	1.7	6,911	7	41,922	0.08
Swiss	....	.....	....	.....	....	.....	.....	440	1	440	0.00
Philippine	....	.....	....	.....	....	.....	.....	7,144	6	7,144	0.01
Paraguayan	....	.....	....	.....	....	.....	.....	1,015	1	1,015	0.00
Moroccan	....	.....	....	.....	....	.....	.....	11,941	14	11,941	0.02
New Zealand	....	.....	....	.....	....	.....	.....	3,325	1	3,325	0.01
Lebanese	....	.....	....	.....	....	.....	.....	530	1	530	0.00
Pakistan	1	9,760	....	.....	1	9,760	0.4	1,100	2	10,860	0.02
Costa Rican	1	12,012	1	13,625	2	25,637	1.2	1,465	4	27,102	0.05
Korean	1	7,420	....	.....	1	7,420	0.4	9,528	4	16,948	0.03
Austrian	....	.....	....	.....	....	.....	.....	697	1	697	0.00
Japanese	39	761,842	28	541,211	67	1,303,053	76.0	106,031	135	1,409,084	2.82
Dominican Republic	....	.....	....	.....	....	.....	.....	4,765	2	4,765	0.01
Liberian	269	7,152,422	53	874,575	322	8,026,997	511.5	25,195	333	8,052,192	16.14
Thailand	....	.....	....	.....	....	.....	.....	875	1	875	0.00
Indian	1	10,172	1	13,125	2	23,297	1.2	1,700	4	24,997	0.05
Irish	....	.....	....	.....	....	.....	.....	3,350	1	3,350	0.01
Iceland	....	.....	1	16,730	1	16,730	1.0	1,685	3	18,415	0.04
Egyptian	1	8,700	1	16,900	2	25,600	1.3	.....	2	25,600	0.05
Israeli	4	53,473	....	.....	4	53,473	2.8	.....	4	53,473	0.12
Saudi Arabian	1	46,548	....	.....	1	46,548	3.2	.....	1	46,548	0.09
Iranian	....	.....	....	.....	....	.....	.....	950	1	950	0.00
Total	1,372	27,380,544	1,300	20,444,498	2,672	47,825,042	2,845.8	2,058,520	3,873	49,883,562	100.00

Note: The above includes 37 combination ore and tankships of 782,441 d.w. tons. Equivalent to 47.9 T-2's.

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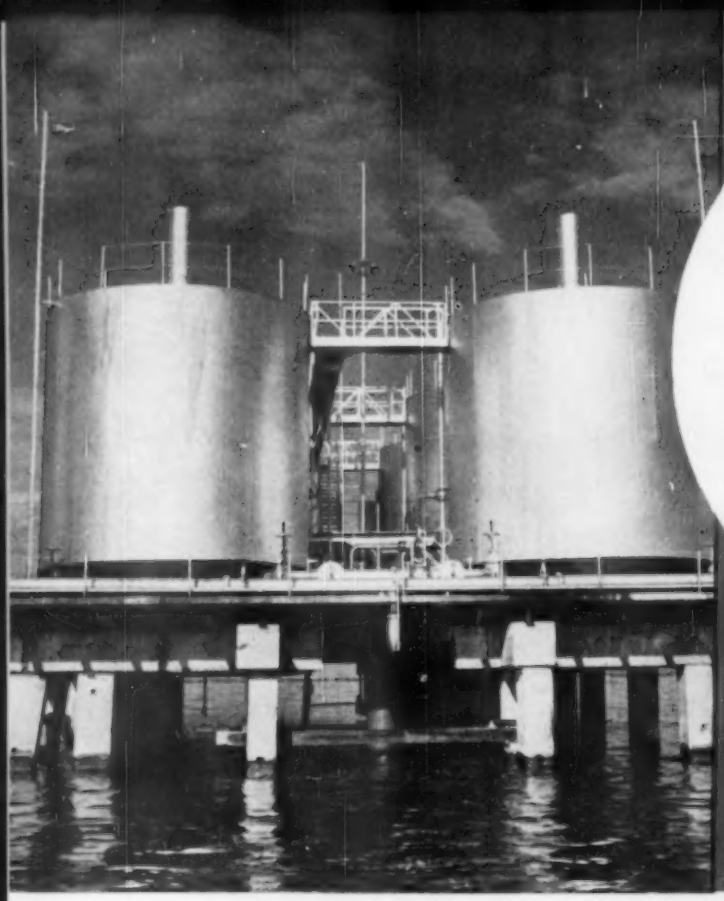

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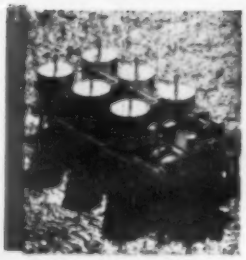
SINCE 1893

A Columbian shipment of master-crafted tank plates was quickly welded into six tight oil tanks at Creole Petroleum Corporation's Lake Maracaibo, Venezuela, site. Columbian Tanks serve at countless out-of-the-way places, at home and abroad.



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In a recent letter to Columbian, Morrison-Knutsen Co., Inc., internationally known contractors and engineers, said:

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Box 1349, Odessa
Texas Gulf Tank Co.
Box 14281, Houston
Columbian Steel Tank Co.
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Box 941, Odessa
B. A. Box Tank & Supply Co.
Box 547, Beeville
Martin Tank Co.
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Australian Oil Search Gets Boost

. . . as government allocates partial-subsidy funds

By W. D. Mott
Consulting geologist, Brisbane.

EXPLORATION ACTIVITY down under has shown an upward trend since September 1956, distributed over most basins. Completed wells total 20 for the year and 6 are in progress.

Because of the importance of domestic petroleum supplies the Commonwealth Government has allocated £500,000 to assist exploration. It is proposed to distribute this money direct to companies extending exploration into virgin territory by subsidizing up to 50 per cent of drilling costs. Although the amount is not sufficient to stimulate widespread activity it will encourage bold exploration and insure against complete stagnation of effort.

The Department of National Development has been assisting the search indirectly for several years through the geological and geophysical study of sedimentary areas by the Bureau of Mineral Resources.

Further gas was located in Papua but no production figures are available. The 2 Kuru well encountered Tertiary gas at 1,640 ft. in the same reservoir as that which blew wild in No. 1 in 1956. Cretaceous gas, considered to be of significant quantity, was found at 6,310 ft. in Barikewa. These gas resources would be of considerable importance if the country were industrialized.

AUSTRALIA saw an upward trend in exploration during 1957. Drilling, though unsuccessful, was scattered over most of the continent in nearly all its sedimentary basins. The Commonwealth Government now has agreed to subsidize exploration by underwriting up to 50 per cent of drilling costs.

They may prove economic to use in the bauxite field being developed near Cape York in northernmost Australia.

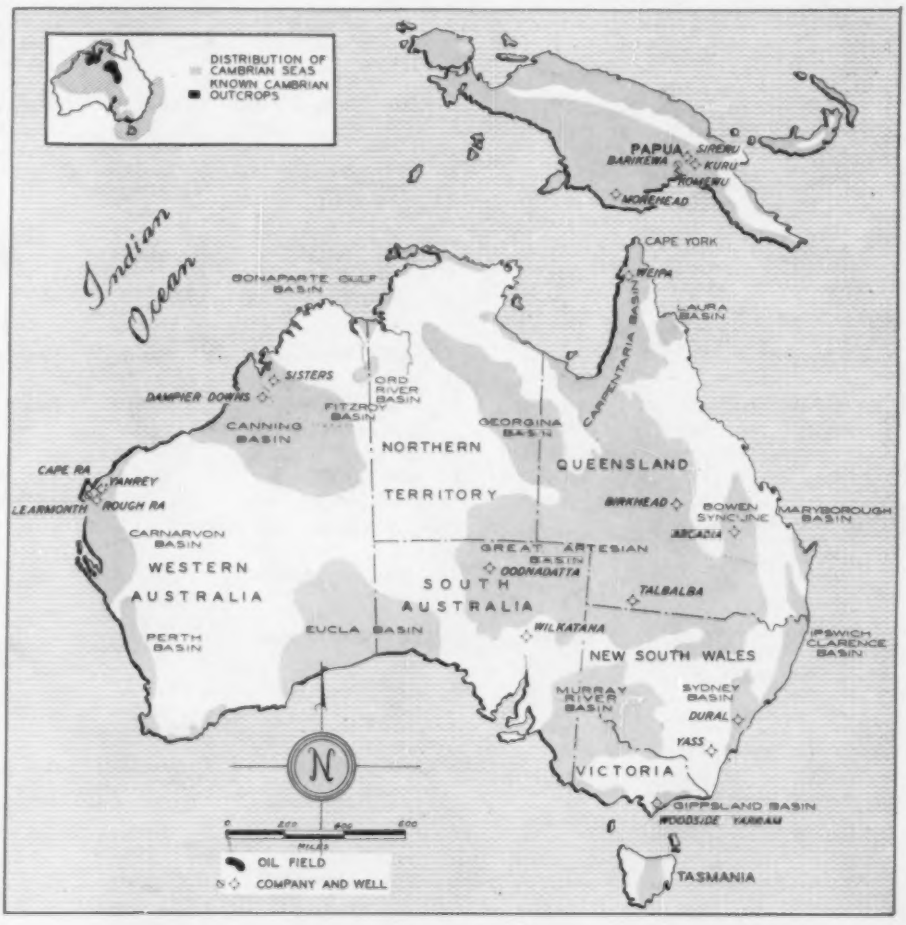
West Australian Petroleum is still unsuccessfully searching for further oil reservoirs in the Carnarvon basin. Despite considerable geophysical and geological information the subsurface interpretation of the region is unreliable. This is brought out very blatantly by 10 Rough Range which was drilled only 700 ft. north of No. 1 discovery well. The recent well was predicted to penetrate the Birdrong sand upstructure against a fault trap; it was found structurally lower and produced water with a trace of oil and gas.

An important point brought out by 10 Rough Range is that gas occurs in the Birdrong reservoir. Accumulations of undepleted oil can now be expected in this formation.

Santos, Ltd., still pins its faith on Cambrian oil. Exploration is extending into Great Artesian Basin where the Lower Paleozoic is covered by Mesozoic sediments.

Papua-New Guinea

Australasian Petroleum Co. and Island Exploration Co. have continued full-scale operations. Transport difficulties are greatly reduced by the use of Bell helicopters in survey work and Helirigs served by three helicopters



for drilling the more inaccessible structures.

The Puri anticline, which has been ignored because of difficult access, will be drilled shortly and is extremely promising. Further holes are planned for Kuru and Komewu.

Papuan Apinaipi Petroleum Co. plans to drill a late Tertiary area to the east of Australasian Petroleum Co. areas.

Western Australia

West Australian Petroleum Co. completed Dampier Downs well in Devonian limestone and Associated Freney Oil Fields N.L. drilled the Sisters structure on the northern margin of the Fitzroy basin.

WAPET has been active in the Perth basin with surface exploration and in the Carnarvon basin five wells were completed.

Fitzroy and Canning basin . . . Devonian limestone has now been proved to exist on each margin of the Fitzroy basin. It was not found in the trough because of excessive depth. It is estimated that 30,000 ft. of sediments were deposited in this trough.

The margins are to receive more attention.

The Canning basin, which is an extension of the Fitzroy, will be drilled on completion of seismic surveys.

Carnarvon basin . . . WAPET is still unsuccessfully searching for traps in the Rough Range area and drilled several structural holes. Complex subsurface structure has so far defied interpretation.

At Dirk Hartog Devonian (?) limestone was found at 3,300 ft.

A new test, 1 Learmonth, has begun on the east flank of Cape Range structure which should find the pinchout of thick sediment found farther west.

Victoria

Gippsland basin . . . Little new evidence has been obtained to throw light on the problem of Gippsland's oil potential. Efforts to locate permeable zones or margins to the glauconitic host rock at Lake Entrance are in progress as is an attempt to penetrate the thick Jurassic sequence and evaluate the buried Paleozoic rocks.

Murray basin . . . Geophysical examination of this masked basin is in progress. Discovery of Cretaceous in

Oil Exploration in Australia and

	Depth (ft.)	Completed	Formations penetrated (ft.)	Remarks
QUEENSLAND				
ARTESIAN BASIN MARGIN:				
South Pacific, Ltd.:				
Birkhead	5,186	June 1957	Triassic 1,250 Permian	Unconformity at 5,050 ft.; drilling ceased in calcareous siltstone.
Australian Oil & Gas Corp.:				
Talbalba	774	September 1957	Mesozoic	Stratigraphic.
CARPENTARIA BASIN:				
Zinc Corp.:				
Weipa	3,092	September 1957	Cretaceous 2,958 Porphyry	
BOWEN SYNCLINE:				
Associated Australian Oilfields:				
7 Arcadia	3,280	July 1957	Permian	
VICTORIA				
GIPPSLAND BASIN:				
Woodside (L. E.) Oil Co.:				
2 Woodside	8,862	February 1957	Tertiary 3,675 Jurassic	Limit of plant.
4 Woodside	2,572	February 1957	Tertiary	Junked.
1 Hedley	3,400	Drilling	Tertiary 130 Jurassic	
1 Oilco	1,298	Drilling	Tertiary	1,290 ft., slight gas; oil impregnated glauconite.
Frome Lakes Pty., Ltd.:				
Five structural holes, total feet	8,755		Tertiary	
Westralian Oil, Ltd.:				
Yarram	1,812	March 1957	Tertiary 1,812 Jurassic	
PAPUA-NEW GUINEA				
PAPUA:				
Island Exploration Co.:				
1 Komewu	6,377	Drilling		
Barikewa	7,992	Drilling	Tertiary 3,000 Cretaceous	Gas at high pressure, 6,310 ft.
Australasian Petroleum Co.:				
Morehead	8,088	January 1957	Quaternary 400 Tertiary 2,400 Cret. (?)	Hole junked just short of seismic basement depth.
2 Kuru	7,305	June 1957	Tertiary (?) Cretaceous	Gas at 1,640 ft., same reservoir and pressure as 1 Kuru.
Sireru	1,510	August 1957	Tertiary	Kuru gas reservoir equivalent water flooded.

the Loxton bore last year suggests thicker sediments than previously anticipated.

New South Wales

Principal operator in this state is Australian Oil & Gas Corp., which is searching for Permian gas in the vicinity of Sydney and the industrial city of Newcastle.

The Murray and Great Artesian basins are also receiving attention.

Queensland

Great Artesian basin . . . An important dry hole is that at Birkhead drilled for South Pacific, Ltd., with American capital. This hole penetrated Permian of continental facies and was terminated below an unconformity in unmetamorphosed calcareous siltstone showing moderate dips and containing plant fragments of probable Permian age. The presence of an unconformity in the Permian is important because it increases the possibility of the lower sediments being marine and being distributed around the eastern margin of the Great Artesian basin.

Other portions of this vast basin are receiving attention aimed at evaluating the marine Cretaceous and pre-Mesozoic floor rocks.

Bowen syncline . . . Associated Oil 7 well on the Arcadia structure was a bitter disappointment. It was drilled down the east flank from a gas well and penetrated tight marine Permian beds. The reservoir of the gas in the crested well is unknown and production may be from fractures puncturing a pinched-out formation down the steep west flank. This explanation requires an unconformity in the Permian as proved by the Birkhead well.

Carpentaria basin . . . This northern basin with Cretaceous targets was first drilled at Weipa where a heavy flow of artesian water was found near basement. Other wells are planned this year.

South Australia

Santos, Ltd., is following out the program to test the Cambrian beneath Tertiary cover. The company is also working eastwards into the Great Artesian basin where structure has been proved.

Dr. A. I. Levorsen visited and advised on the company's concessions. He made the point that presence of oil and brine indicated effective trap conditions.

New Guinea, October 1956–September 1957

	Depth (ft.)	Completed	Formations penetrated (ft.)	Remarks
WESTERN AUSTRALIA				
FITZROY AND CANNING BASINS:				
West Australian Petroleum Pty., Ltd.:				
Dampier Downs	3,028	December 1956	Paleozoics	Junked in Devonian limestone.
Associated Freney:				
Sisters	9,828	June 1957	Permian 5,183 Carboniferous 6,190 Devonian	Devonian very tight.
CARNARVON BASIN:				
West Australian Petroleum Pty., Ltd.:				
4 Cape Range	3,858	October 1956	Tertiary 400 (?) Cretaceous 3,675 Jurassic	Birdrong sandstone dry.
10 Rough Range	3,740	July 1957	Tertiary 400 (?) Cretaceous	Located 700 ft. northeast of 1-A discovery well. Birdrong sandstone 3,659 ft. (reservoir of 1-A) downstructure. Produced salt water, 2 per cent oil, little gas.
1 Learmonth	1,280	Drilling		Northwest of Rough Range.
5 Rough Range, South	4,760	November 1956	3,770 Birdrong	Faulted section.
1 Yanrey	1,395	July 1957	1,395 Metamorphic	35 miles northeast of Rough Range.
17-B Dirk Hartog	4,998	May 1957	2,180 Birdrong 3,300 (?) Dev. (?)	3,290 ft. fluorescence.
16 structural holes, total feet	15,638			
NEW SOUTH WALES				
SYDNEY BASIN:				
Australian Oil & Gas Corp.:				
1 Dural	5,203	August 1957	Permian	3,063 ft., show of gas, abnd.
Yass	1,107	November 1956	Paleozoic	Structural.
2 Dural	760	Drilling		
Three structural holes, total feet	1,326			
SOUTH AUSTRALIA				
PIRIE-TORRENS BASIN:				
Santos, Ltd.:				
Wilkatana area:				
Nine structural holes, total feet	4,500			Cambrian below Tertiary cover.
Parachilna area:				
One structural hole, total feet	720			Cambrian below Tertiary cover.
ARTESIAN BASIN MARGIN:				
Oodnadatta	1,322	September 1957	Cretaceous 1,320 L. Paleozoic	Oil showings in Cretaceous.

A. B. Vaught says . . .

"We shopped around, and . . .

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Mr. Vaught says:

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This is our third CARDWELL rig, and, due to the fact that repair and replacement have been practically nil on the other two, I have every confidence in the L-350 with its new free-standing mast as a lightweight, high capacity draw works."

**The unit purchased by A. B. Vaught, Midland, Texas, is a twin-engine, single-drum L-350 with rotary drive and a 15" double rotor hydromatic brake package, in combination with Cardwell's new 96' free-standing mast.*

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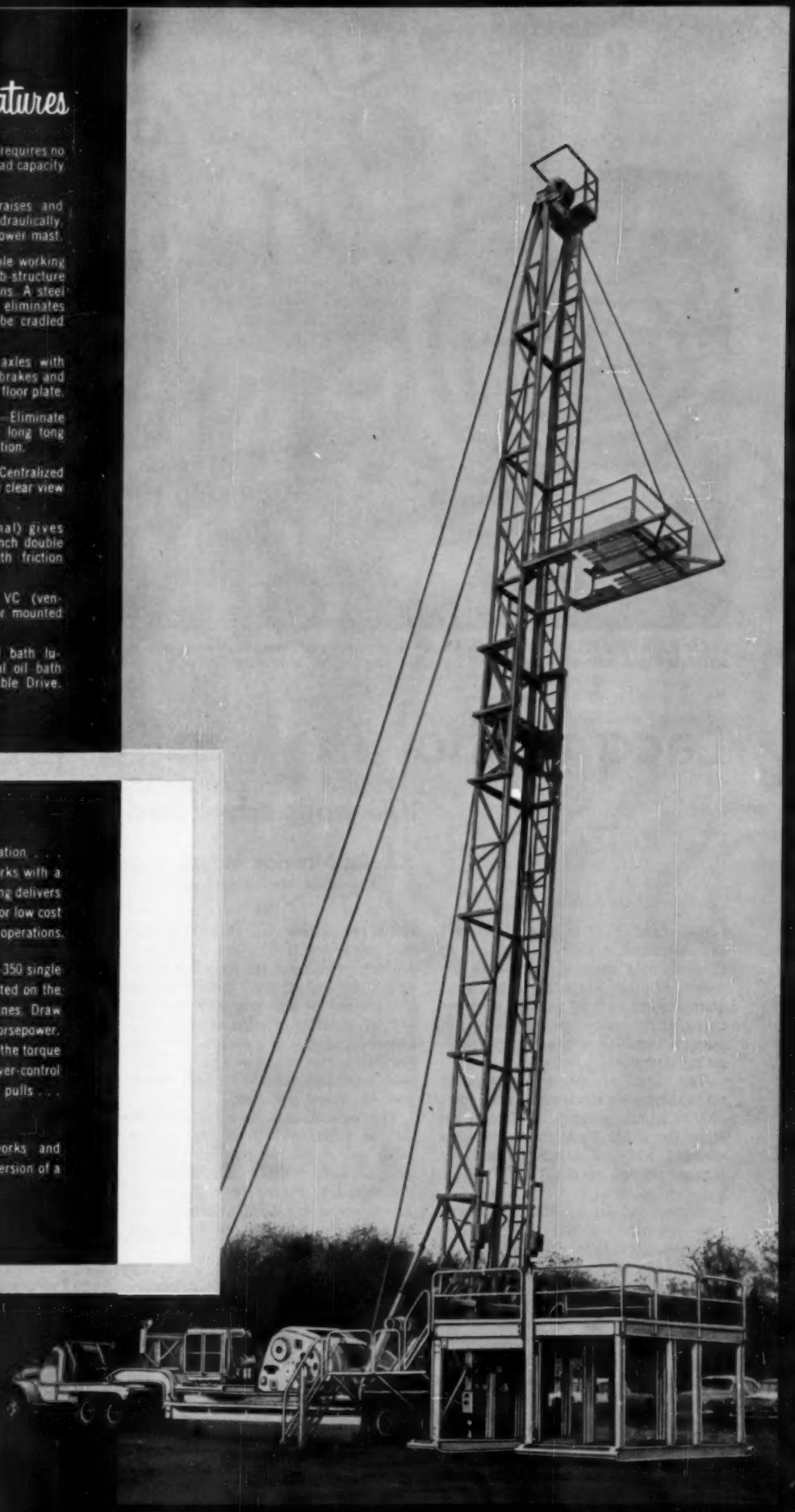

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LACQ FIELD PROCESSING PLANT, located in southwestern France, includes a two-stage sulfur-recovery unit (first stage to the right and second stage in foreground), a natural-gasoline plant (at left), and a catalytic reforming unit.

Lacq a Shot in Arm to France

100 wells scheduled for this big field

By Maurice Moyal
Consultant, Marseilles, France

LACQ GAS FIELD in southwestern France promises to be a big boon to the country's economy, not only because of the availability of large quantities of natural gas but also because of the sulfur and gasoline production resulting from the gas-processing operation.

The first of six field-processing units is now on stream handling some 35,000 M.c.f. per day of natural gas from the field. Four more units are planned with an expected final gas throughput of some 700,000 M.c.f. per day.

Because of its 9,670-psia. bottomhole pressure and the 15.3 per cent hydrogen sulfide content of its gas, exploitation of Lacq field, containing at least 5.3 trillion cubic feet of condensate-bearing gas, was fraught with many tough technical problems. The development of highly corrosion-resistant steels permitted the construction and initial operation of the first unit in April 1957.

Sulfur production . . . The sulfur unit now processes 35.4 million cubic feet per day of natural gas from six wells to get a yield of 21.2 million cubic feet per day of lean gas, 150 tons per day of practically pure rock sulfur, 280 bbl. per day of gasoline, 137 bbl. per day of propane, as much of butane, and considerable ethane, which goes to power the plant.

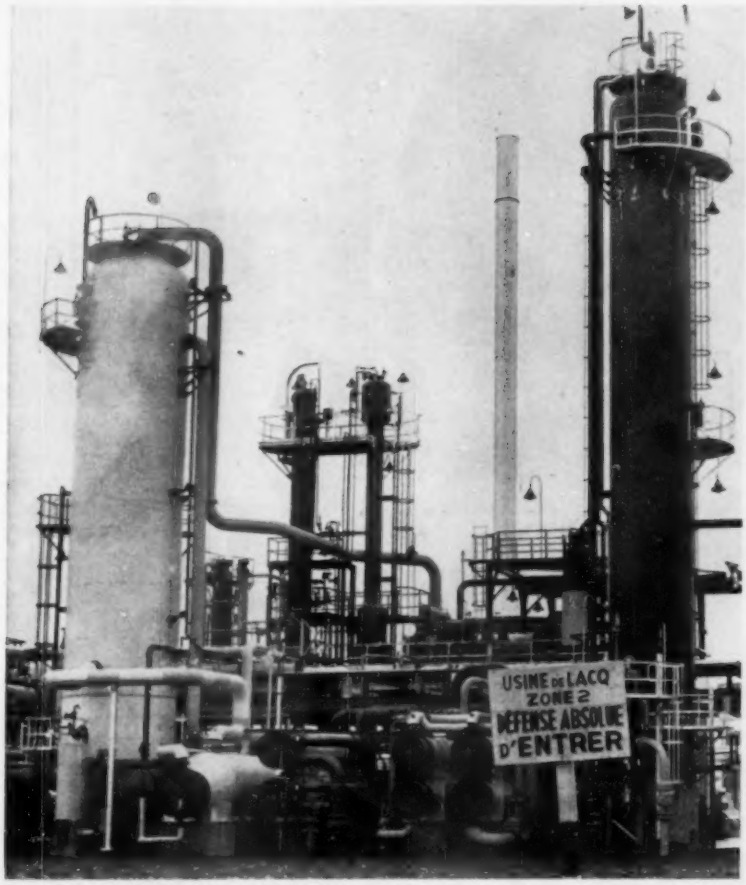
The second unit, due for completion in 1958, will treat 141 million cubic feet of gas per day for a yearly yield of some 300,000 tons of sulfur. This will free France from the necessity of importing 250,000 tons of unrefined sulfur a year from the United States.

Progressively, as more wells are spudded—100 in all are scheduled—the third, fourth, and fifth units will expand the production of elemental sulfur to 1,200,000 tons per year from 700 million cubic feet per day of gas.

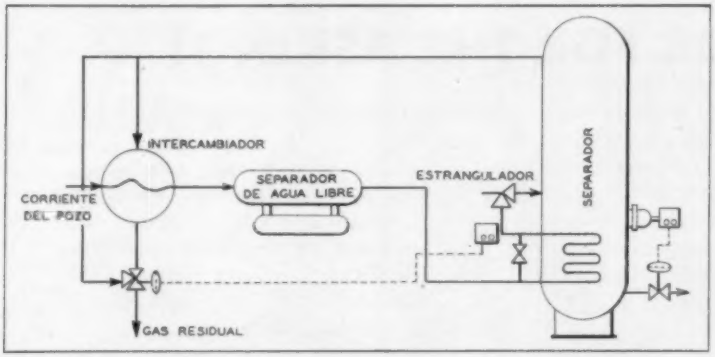
After satisfying French industrial requirements, expected to reach 400,000 tons by 1962, there will then be an exportable surplus of 800,000 tons. France will become the world's second major producer of sulfur, after the United States, and ranking on a par with Mexico.

Up-to-date installations . . . The Lacq plant, 15 miles northwest of Pau, in southwestern France, incorporates the most modern facilities in a new type of layout by which building construction is reduced to a minimum. Provision has been made for a later expansion that will boost its initial floor space 10 times and its production 20 times, at a cost of well over 100 million dollars. At the present stage, the plant consists of the following major units:

- Power house, separator plant, and dehydration system.
- A two-stage sulfur-recovery unit, where the crude gas is treated by diethanolamine, then by an aqueous solution of caustic soda.



CLOSEUP of the Claus-type sulfur-recovery unit at Lacq. (Courtesy of Societe Nationale des Petroles d'Aquitaine.)



PROCESS SCHEME includes desulfurization by diethanolamine followed by caustic wash, dehydration absorption and fractionation. Fig. 1.

- A natural-gasoline plant.
- A catalytic reforming unit.

The plant was engineered by Foster Wheeler Engineering, except for the second-stage sulfur recovery section engineered by Parons & Heurtey. This was constructed for a high recovery by the Societe Fouga, Beziers, France.

The crude gas is released from the six widely spaced wells at a pressure of 1,422 psia. (wellhead pressure works out at 8,330 psia. shut and 6,690 psia. in service). It is checked at the valve to give a pressure of 995 psia., delivered by the collecting mains to the separator plant, and there separated into gas and condensate stream (Fig. 1). The condensate travels by a 3-in. pipeline, and the acid gases pass by a 14-in. pipeline to the sulfur-recovery unit.

The analysis of the gas from the separator is:

	Per cent
H_2S	15.30
CO_2	9.53
C_1	68.78
C_2	3.25
C_3	0.98
C_4	0.65
C_5	0.26
C_6+	0.66
N_2	0.59

It contains 0.00075 lb. of water per cubic foot. Per cubic foot, the gas carries 100 grains of hydrogen sulfide, against Elk Basin's 120, and Canada's Pincher Creek's 70.

Claus process . . . The 60-year-old-plus Claus process is used at Lacq. It consists of a partial oxidation of H_2S to sulfur by air in presence of a beaded catalyst on a steel grill. The essential improvements here bear upon the almost total recovery of the exothermic heat of the reaction, the increase in the yield of conversion through the use of several screens of catalysts with intermediary conversion of sulfur, and a strict control of the H_2S-air ratio.

The over-all formula of the reaction can be written as follows:

$$3H_2S+3/2O_2 \rightleftarrows 3/2S_2+3H_2O \quad (1)$$

Sulfur is effectively and directly produced that way at Lacq, but this is normally the result of two successive reactions:

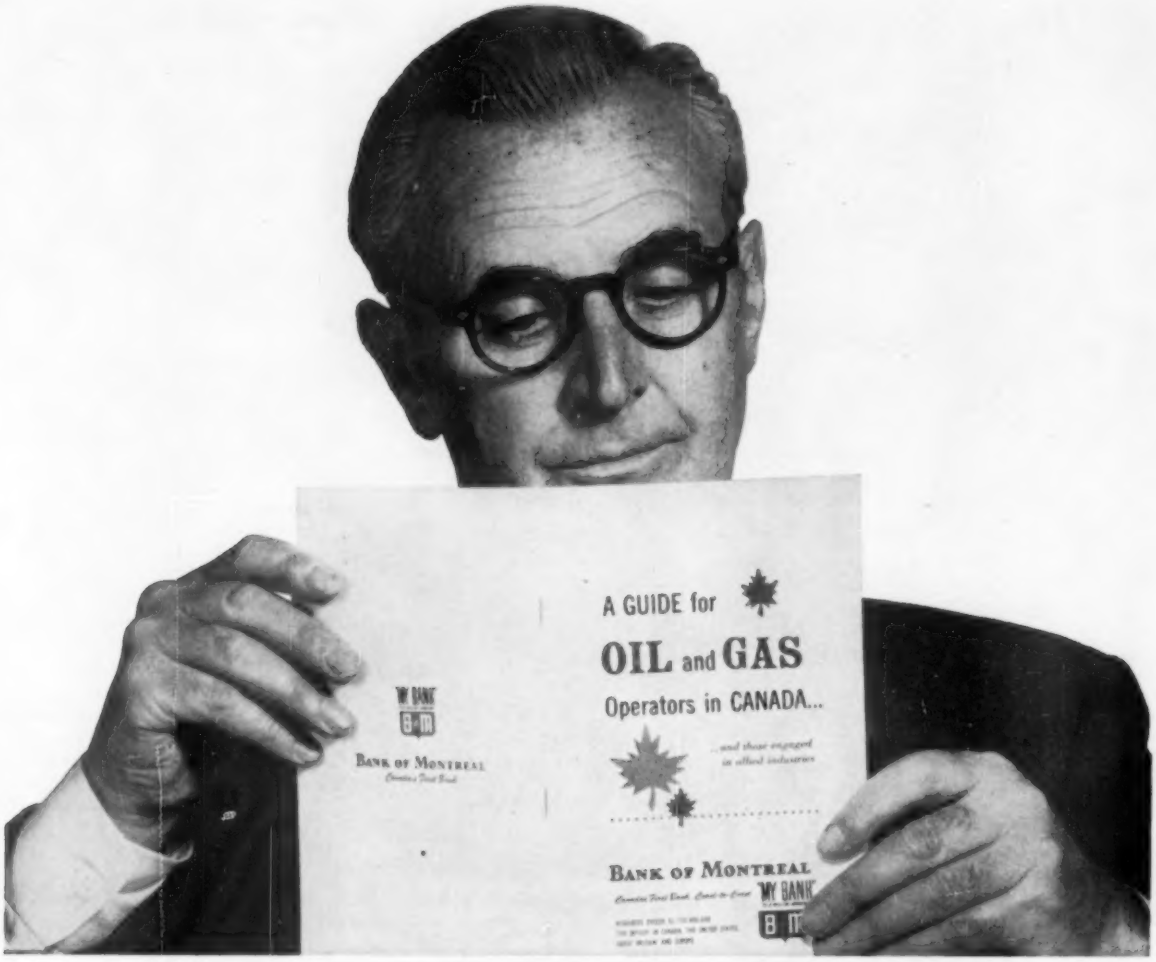
$$H_2S+3/2O_2 \rightarrow SO_2+H_2O \quad (2)$$

$$2H_2S+SO_2 \rightleftarrows 3/2S_2+2H_2O \quad (3)$$

The water-saturated gas from the separator first passes through a stripper where the remaining amounts of condensate are further separated, then it is heated slightly to insure optimum control of the stream. At the primary desulfurization stage, the acid gases, composed of hydrogen sulfide (57 per cent), carbon dioxide (37.5 per cent), hydrocarbons (1 per cent), and water (4.5 per cent) are washed in a 71-ft. column with an aqueous solution of diethanolamine, which preferentially absorbs most of the H_2S and CO_2.

The diethanolamine is regenerated in a 25-tray stripper. The hydrogen sulfide and the carbon dioxide then pass from the stripper to a sulfur-recovery unit.

At the final desulfurization stage, the remaining amounts of the two gases are further stripped out by pumping through an aqueous solution



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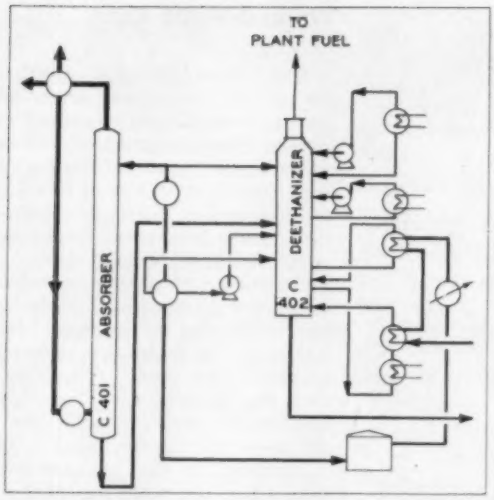
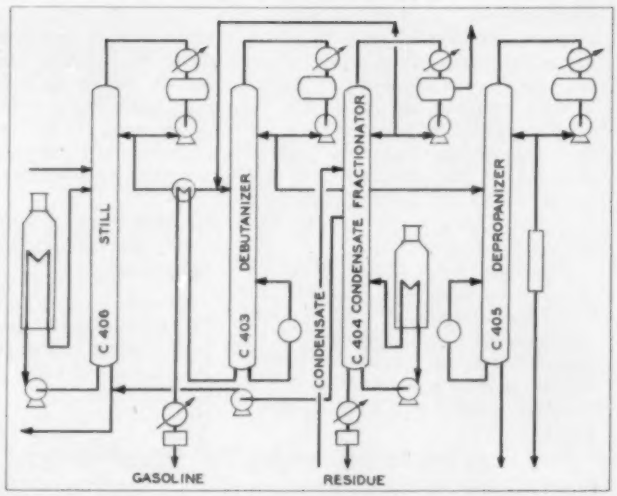


ABSORPTION-DEETHANIZATION section at Lacq field process plant. Fig. 2.



FRACTIONATION SECTION including depropanizer, debutanizer, and condensate fractionator. Fig. 3.

of caustic soda. Thus, they are turned into soluble salts and completely absorbed. The gas from this unit is passed on to the gasoline plant.

The caustic is conveyed from the bottom of this column to be heated in exchangers for stripping out the mercaptans. Spent caustic soda solution is allowed to run to waste. The cost of a rejuvenation section is not justified in the first unit of the Lacq plant. But, with further expansion, such facilities will be provided later.

Recovery of liquid sulfur . . . The acid gases, composed of hydrogen sulfide (66 per cent) and carbon dioxide (34 per cent), are burned in installations including:

- A furnace, of the Scotch marine type, where reactions (2) and (3) take place. It includes a combustion chamber, three combustion tubes, a convector, and an exit chamber. Calculated temperatures are: 2,400° F. in the burners, 1,560° F. in the intermediate chamber, and 480° F. in the exit chamber.

Once started the reactions are exothermic, the air for combustion is supplied by a turboblower, powered by the steam generated by its own heat.

- Two catalyst chambers where reaction (3) is continued. Each comprises a catalytic converter, a gas-heater and a sulfur-condenser of the vertical tubular type. Part of the sulfur is recovered in the low chamber of the two converters. On the calandria side of the condenser coming after the first catalyst chamber, it functions as a low-pressure steam generator. The water level is regulated in a manner to adjust the temperature of the exit gases to around 300° F.

The steam of the condenser after the second catalyst chamber goes at a pressure of 178 psia. to preheat the circulation water for the furnace and the condensers. Each catalytic convector contains a 45-ton, 3-ft.-thick catalyst charge placed upon a stainless-steel grill. The medium used is an activated bauxite, in granules of about 6-12 mm., composed of Al_2O_3, 88-92 per cent; Fe_2O_3, 1-2 per cent; SiO_2, 6-7.5 per cent; and TiO_2, 2-3 per cent.

- A coalescer which recovers the remaining amounts of vesicular sulfur in the gas leaving the last condenser. Here, the disperse liquid phase is simply separated upon a layer of Rashig rings.
- An incinerator, where, in the presence of excess air, the waste gases are heated at such temperature as to eliminate the remaining amounts of obnoxious hydrogen sulfide before evacuation to atmosphere by the exhaust chimney. Over 150 ft. tall, it is made up of corrosion-resistant metals, topped by stainless steel.

EVENTUALLY Lacq will produce 1,200,000 tons a year of pure sulfur.

High recovery . . . With two stages of catalysis, the over-all recovery of liquid sulfur works out at around 94-95 per cent. It was envisaged to provide a third stage of catalysis. But the 1.5-2 per cent boost in recovery, and the insignificant reduction in the amounts of SO_2 released to atmosphere, would not warrant the capital outlay involved, insofar as the first units are concerned.

The liquid sulfur goes from the furnace, condensers, and coalescer into a 400-ton intermediary pit, fitted with steam-heated coils, whence it is pumped into the storage vats. It is cooled in these concrete vats, and allowed to solidify into 5,000-6,000-ton blocks.

These are broken up by explosives and carried by belt-conveyors for shipment by railways. Liquid sulfur is moved off by tank cars. The final rock sulfur has a 99.94 per cent pure sulfur content, the remainder being asphaltic, 0.01 per cent; ash, 0.01 per cent; and moisture, 0.04 per cent.

Gasoline plant . . . After desulfurization, about 25.8 million cubic feet of gas contain:

	Per cent
C_1	92.10
C_2	4.26
C_3	1.30
C_4	0.83
C_5	0.33
C_6+	0.39
N_2	0.79

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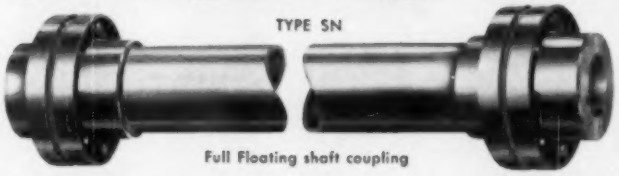

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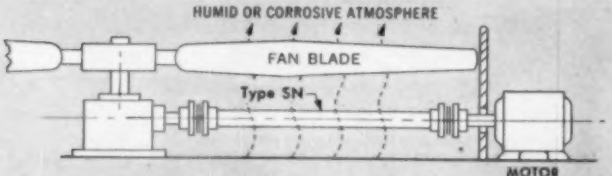

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The gasoline plant separates the wet gas into dry gas, propane and butane; gasoline containing 60 per cent of aromatics, mainly xylene and toluene; and a small amount of residue. To insure optimum separation conditions and a drier gas, fit for transport by pipeline, the condensers operate here at 90° F. and 995-psia. pressure.

The water content must be reduced to prevent the formation of hydrate that would plug the pipelines. Thus, it is imperative to dry the purified gas to subzero dew point. This helps reduce the chances for condensation that would impair the utilization of the gas on existing appliances.

Moreover, a dry gas containing, say 3×10^{-6} lb. water per cubic foot has practically no corrosive action on the pipelines. The stainless, seamless line permits safer operation at high pressures and under all conditions.

The gasoline plant includes:

1. An absorption unit where products ranging all the way from propane and ethane to the heavier hydrocarbons are extracted from the treated gas.

2. A fractionating section to strip out this mixture into gasoline, propane, and butane.

3. A catalytic reforming unit.

Dehydration system . . . The wet gas enters the installations at 110° F., containing 9×10^{-5} lb. water per cubic foot. Precooling lowers its temperature to 80° F., reducing its water-content by 60 per cent. It is passed then to the dehydration system that consists of two dehydration columns arranged in tandem for alternate operation.

One column is employed for dehydration, while the other is being regenerated with a stream of fuel gas at 360° F. A whole cycle lasts 16 hours. It takes 8 hours to dry the gas, 4 hours to regenerate a column, and as much time to cool it.

Each column contains several beds of desiccants suitably supported on a screen. The medium used is practically pure activated alumina, in granule of about 5-10 mm. Extremely porous, the many particles possess on the order of 10^6 sq. ft. of adsorptive area per pound. The total charge of alumina adds up to 2,750 tons per column.

The wet gas is passed through several beds of alumina. During operation, three areas are encountered in a column: one where the alumina charge is saturated with water, another where the water content is variable, while

the third is liquid-free. The discontinuous operation must be stopped before the second area reaches the bottom of the column. The gas emerges at a dew point of —20° F.

Absorption process . . . This currently is used at Lacq, so as to remove the condensable hydrocarbons by means of an absorption oil. The unusual feature here is the provision of a propane cooler.

In the absorption - deethanization section, shown by Fig. 2, the gaseous feed, made up of C_1 (95.4 per cent), C_2 (3.5 per cent), and C_3 (0.3 per cent) is propane-cooled to —15° F. It is fed at 995-psia. pressure to an 85-ft.-tall column, C401, containing 30 trays. The absorption oil rate is 115 g.p.m.

At the bottom of the 87-ft.-high C402 column (deethanizer), containing 25 trays, the decompressed, then heated fuel gas, consisting of C_1 (98 per cent) and C_2 (2 per cent) is absorbed at 170 psia. pressure at a rate of 159,000 cu. ft. per day. Here again, the gases are circulated counterstream to the absorption-oil, whose intake is 165 g.p.m. The paraffin-base oil has been replaced progressively by an aromatic affair here.

Fractionating unit . . . In this unit, illustrated by Fig. 3, the recovered hydrocarbons are extracted from the absorption-oil through distillation. The deethanizer absorption-oil travels to column C406, at the bottom of which it is regenerated for further use. Gasoline and lighter hydrocarbons are emitted at the top. The condensate passes to column C404, where residues, gasoline, and lighter hydrocarbons are likewise stripped out.

The top products of columns C406 and 404 are fractionated into gasoline, on the one hand, and C_3 and C_4 on the other. The mixture is subjected a final desulfurization stage, to rid it of the remaining amounts of mercaptans. It travels to column C405 for separation into butane and propane. The propane is dried upon alumina beds to bring it up to specifications.

A catalytic reforming unit has been provided to meet the progressive increase in the octane number in premium motor gasoline and allows for a greater flexibility in products obtainable.

The economics of the process will be further improved in making ethylene from ethane, propane, and other feed stocks. The gas-derived ethylene will find its greatest uses in ethylene oxide, ethylene glycol, and polyethylene. A catalytic polymerization plant will be provided later. France plans to eventually produce a full range of petrochemicals based upon natural gas.

Industrial sites . . . The big sources of power afforded cheaply by Lacq will create a heavy industrial concentration in its immediate vicinity. The local plants already in existence are making preparations to greatly enlarge their facilities and range of products. France's Electrical Board is already breaking ground here for a 125,000-kw. thermal plant, relying on gas to power it.

Pechiney, the biggest French aluminum producer, will have in operation here by 1960 an aluminum electrolysis plant with a 50,000-60,000-ton yearly capacity, representing well over one-third of the country's current output of aluminum.

If, as it is suspected, the Lacq deposits extended in a westerly direction, their reserves would have to be revised considerably upwards, perhaps to 10.6 trillion cubic feet. Lacq would then take on a Continent-wide importance. **End.**

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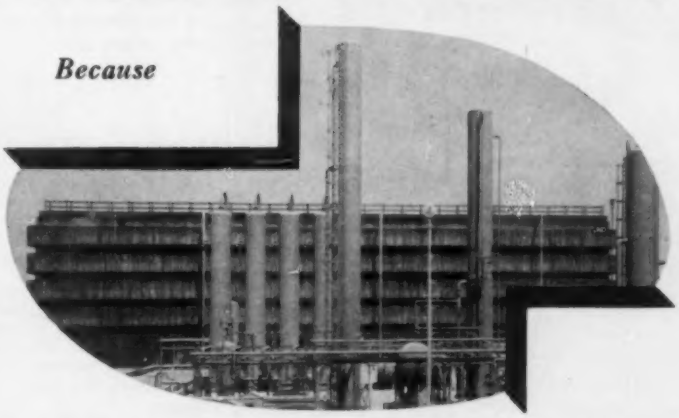

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BOOKS

THE LAW OF POOLING AND UNITIZATION by Raymond M. Myers. Published by Matthew Bender & Co., Inc., 255 Orange Street, Albany 1, N. Y. 833 pp. $25.

This book is unique. It is the only one which comprehensively covers the laws and customs applicable to unitization both voluntary and compulsory. Also this book covers voluntary and compulsory pooling. The value of Myers' work lies not only in his treatment of the legal problems involved but also in his treatment of the practical ones incident to preparing a unitization agreement or plan, and then putting it into effect.

Included are chapters on: (1) Conservation and History of the Unitization Idea, (2) Pressure Maintenance and Secondary Recovery Operations, (3) How Units are Created, (4) Negotiation and Execution of Voluntary Unit Agreements, (5) Unit Agreements, (6) Procedure for Securing Approval, (7) Legal Questions Involved, (8) Compulsory Pooling and Unitization, (9) Procedure for Hearings before Regulatory Authorities, (10) Taxation Affecting Unitization, (11) Public Lands, (12) Antitrust Laws, (13) Nature of the Unitized Title, (14) Legal Problems, and (15) Agreements, Notices, Orders, Statutes.

Any lawyer interested in oil and gas law will find valuable information in this book and will want to keep it available for use in connection with specific pooling and unitization problems, according to Wilmer D. Masterson, professor of law, Southern Methodist University, who wrote the Foreword for the book.

MAINTENANCE ENGINEERING HANDBOOK, by L. C. Morrow. Published by McGraw-Hill Book Co., Inc., 330 West Forty-second Street, New York 36, New York. $20.

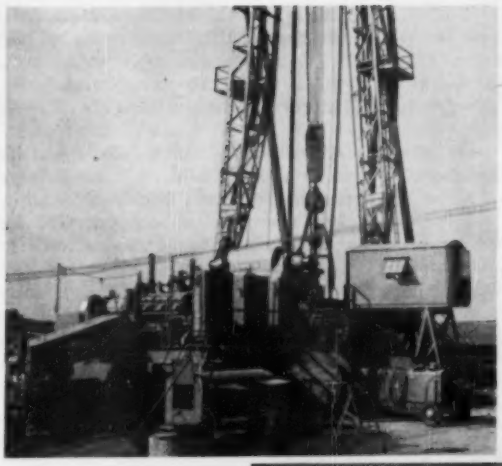
This book is written in engineering handbook form. There are 16 separate sections, each of which presents descriptions of fundamentals, methods, equipment and materials, many reference data, and many illustrations. The writers include 75 specialists in the various phases of maintenance engineering.

The book presents a practical discussion of the technicalities of the upkeep of buildings and mechanical, electrical, and servicing equipment. Also covered are such problems as stores and their control, lubrication, instruments, sanitation, welding, and corrosion.

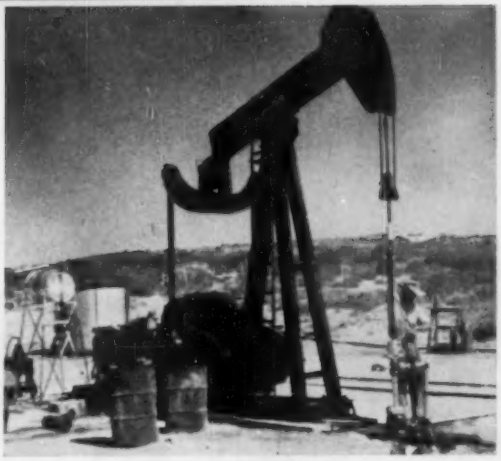
Titles of the sections are: (1) Organization and Administration of the Maintenance Forces, (2) Maintenance Personnel Administration, (3) Planning and Scheduling Maintenance Work, (4) Project Control, (5) Costs and Budgets for Maintenance Operations, (6) Maintenance of Buildings, (7) Maintenance of Electrical Equipment, (8) Maintenance of Mechanical Equipment, (9) Maintenance of Service Equipment, (10) Maintenance of Transportation Equipment, (11) Maintenance Stores and Their Control, (12) Lubricants and Lubrication, (13) Instruments and Instrumentation, (14) Sanitation and Housekeeping, (15) Welding, and (16) Corrosion.

Note: The Oil and Gas Journal maintains a book department. Write to the READER SERVICE DEPARTMENT, P. O. Box 1260, Tulsa 1, for copies of the book list. Often books reviewed here may be purchased from this source.

HELITZ oil field is 30 miles south of Tel Aviv, as shown in the outline map at left.



DEEP Jurassic objectives are being sought by this drilling operation at 22 Helitz, now drilling below 6,000 ft. on the east side of Helitz field.



TYPICAL pumping-unit installation at Helitz field is shown at right. The unit operates at 14 s.p.m. with a 34-in. stroke.

Israel's Heletz field, it's first, now producing 1,500 bbl. daily from 20 wells.

By Joseph A. Kornfeld
Consulting geologist-engineer, Tulsa

THE CURRENT oil-production rate from Heletz amounts to only 6 per cent of the present daily consumption requirements of Israel which approximate 25,000 bbl per day. Israel oil officials estimate that a major oil reserve of about 100,000,000 bbl. is needed to assure self-sufficiency in oil for the country.

Exploration History

A gas seepage associated with oil-impregnated sandstones and a sulfur deposit near Beeri southeast of Gaza was originally prospected by the late G. M. Lees, formerly chief geologist of the Anglo-Iranian Oil Co. This occurrence was near the south end of the Huleiqat anticline in the southern coastal plain of Israel.

This surface evidence led to the location of the Huleiqat exploratory well by Petroleum Development Co., Ltd., (Palestine) which was drilled in 1947 to a total depth of 3,464 ft. where operations were suspended. This well commenced in Pleistocene rocks, cut the Neogene Saqiya marl from 420 to 1,050 ft., logged Judean limestone of Upper Cretaceous age from 1,050 to 3,464 ft. with no oil or gas showings.

In 1955, Dr. Akiba Vroman, Haifa, senior lecturer in mineralogy and geology at Technion University, reworked the anticline and recommended deepening of the well. Weizmann Institute of Science gravity crews from Rehovot mapped a gravity minimum at Heletz. This work was later confirmed by reflection seismograph survey conducted by Seismograph Service Corp., of Tulsa.

Deepening operations were commenced during 1955 by Lapidot Israel Petroleum Co., Ltd., and Israel Oil Prospectors, Ltd., who deepened the well about 1,500 ft. to the base of the Lower Cretaceous rocks. On September 22, 1955, it found 30.5°-gravity oil from 4,906-16 ft. in a Neocomian

sandstone of Upper Cretaceous age. However, this zone was cased off and the well deepened to the lower Heletz sandstone from 4,949-65 ft. where it was completed for 500 bbl. of oil per day through a ⅜-in. choke. The discovery well produced 12,000 bbl. of oil during 1955.

Developmental work . . . The first offset, 2 Heletz, was started 2 months after completion of the discovery well. However, the offset was not completed until April 20, 1956. During 1956, a total of 12 additional oil wells were completed at Heletz for a total combined drilling footage of 60,604 ft. There are now 20 completed oil wells from the upper and lower Heletz sandstone reservoirs.

Oil column . . . A minimum oil column of 216 ft. is known from present well data. The highest subsea structural position of the top of the upper Heletz sandstone is 4,593 ft. The field oil-water contact was determined to be 4,818 ft. subsea from drill-stem-test data. The 14 Heletz logged two stringers of sandstones in the Heletz oil reservoirs. Initially both sandstones were tested together by drill-stem test. However, the lower sandstone was isolated on a second drill-stem test by spotting a plug 10 ft. above the top of the lower sandstone and conducting a drill-stem test on the upper sandstone which recovered pipeline oil to a subsea position of 4,818 ft.

Reservoir pressures . . . Presence of a partial water drive originating from the southeast was indicated on the midyear field-wide reservoir pressure survey completed on July 25, 1957. Isobaric contours indicated good agreement between distribution of higher reservoir pressures and thicker contours of the Heletz sandstones.

Confirmation of a partial water drive is suggested by the condition that 14, 16, and 17 Heletz on the southeastern side of the field exhibit datum pressures of about 2,000 psig. (at datum of 4,659 ft. the approximate midpoint of the pay zones) or only 30 psig. below the initial reservoir pressure of 2,030 psig.

However, there is a pressure differential of 201 psi. between these wells and 3 Heletz which indicated a reservoir pressure of 1,799 psig. in the current survey.

Net effective thickness of oil sandstone ranges from 15 to 18 ft. There is a rapid lateral change in the amount of effective pay sand from well to well due to facies conditions. A spacing pattern of 80 acres per well has been followed in development of the field.

Completion practices . . . With the

BOREHOLE AND CASING PROGRAM PRACTICES

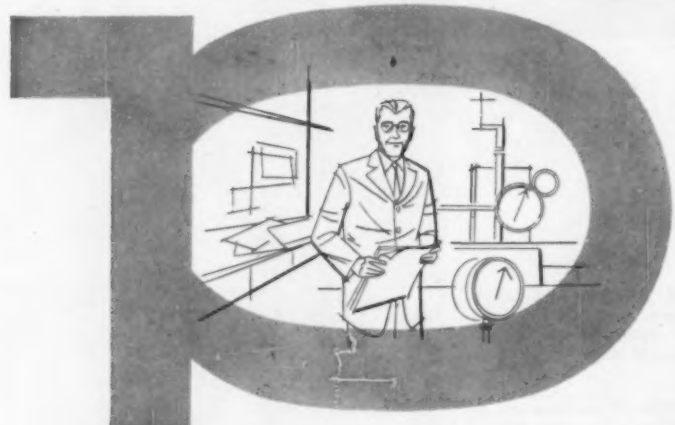
Heletz Oil Field, Israel
Date source: R. W. Walker, Lapidot Israel Petroleum Company, Ltd., Tel Aviv, Israel.

Borehole in.		Depth ft.	Casing size in.	Cement, sacks
17	to	*1,000	13⅜	600
12¼	to	3,500	8⅝	350
8⅝	to	4,900	7	

*Top of Kurkar or Sakieh sandstone.

RESERVOIR DATA, HELETZ OIL FIELD, ISRAEL TYPE OF RESERVOIR MECHANISM: PARTIAL WATER DRIVE.

Average pay depth, ft. subsea	4,700
Highest structural position, top upper Heletz sandstone, subsea	4,592
Oil-water contact, ft. subsea	4,818
Maximum oil column, ft.	226
Maximum reservoir pressure, psig.	2,630
Field average reservoir pressure, July, 1957 (datum —4,659 ft.) psig.	1,825
Lowest reservoir datum pressure, July, 1957 survey	1,799
Maximum loss in reservoir pressure from discovery to July, 1957, psig.	205
Average produced oil gravity, °API at 60° F.	32.5
Initial formation volume factor, bbl.	1.05
Maximum reservoir temperature, ° F.	140
Solubility gas-oil ratio at saturation pressure, cu. ft./bbl., estimated.	30



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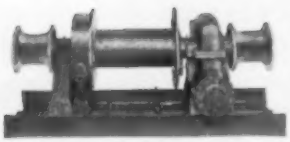

TULSA WINCHES

Tulsa Winch
TULSA OKLAHOMA DIVISION OF VICKERS Inc.

exception of the discovery well, all wells have been completed by setting a string of either 5½ or 7-in. casing through the Heletz sandstone and perforating through the casing. If the completion depth lies at a sufficient height above the water table, 1½ joints of casing are set below the base of the lower Heletz sandstone.

If 7-in. casing is run, six shaped charges per foot of pay are used. But, if either 5 or 5½-in. casing is run, four shaped charges per foot of gross oil pay section are used.

The Heletz sandstone contains a high percentage of bentonite which causes water blocks in the reservoir. To correct this condition, a new completion practice was initiated this year, wherein 10 bbl. of saturated calcium chloride water solution is spotted opposite the oil-reservoir perforations. The solution is made up in a separate pit at the well by mixing 280 lb. of calcium chloride per barrel of water. It is pumped down the tubing.

To inhibit the sloughing tendency of bentonitic shales encountered at Heletz, operators plan to experiment with a low-limestone, low-alkalinity mud with the following composition:

Constituent	Per cent
Caustic soda	0.5
Quebracho	1.5
Kembrake	1.5
Lime	2.0 to 2.5

Maintenance requirements of an 800-bbl. mud system have been planned as follows:

Constituent	Lb./Day
Caustic soda	25
Quebracho	50 to 75
Kembrake	50
Lime	100

South extension . . . A south extension of Heletz field was completed during 1957 at same operator's 2 Brur from the same pay depths as the principal field, flowing 180 bbl. of oil per day through a ⅞-in. choke. Initial tubing pressure was 246 psig.

Current oil rates . . . Lapidot officials report that the individual well capacities now range from 35 to 160 bbl. per day per well. Flowing tubing pressures range from 65 to as high as 240 psig. Out of the 20 producing wells in the field, only 2 are producing salt water; one of these wells is situated on the extreme east side near the oil-water contact.

Crude is handle through low-pressure separators and a central tank battery. A 5-in. 7-mile crude-oil pipeline transports the production northward to a railhead at Migdal Askelon on the coastline. From that point, it is shipped by rail to the refinery at Haifa.

Deeper objectives . . . A deep test planned to test the Jurassic formations is currently drilling below 6,000 ft. at 22 Heletz situated on the east side of the field.

Rig employed is an Ideco 7-11 powered by three Caterpillar diesel motors. The rig has two 7½ by 12-in. pumps.

Acknowledgments

The writer acknowledges the assistance of A. Barnea, Tel Aviv, manager of Lapidot Israel Petroleum Co., Ltd.; R. W. Walker, Tel Aviv, production engineer for Lapidot; and Perez Grader, Jerusalem, head of the oil division, Israel Geological survey.

"Our cardinal rule is clarity, Jamison! Into what lake?"

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The FOREMAN'S PAGE

Here's the Way to Chart Refinery Lubrication Duties

TO HELP the mechanical and operating personnel carry out their lubrication duties in the refinery, lubrication manuals and charts should be prepared for each unit. Charts in such a manual outline the lubrication duties of the operating people for each piece of equipment on the unit.

The following information should be included in each manual:

1. General instructions and responsibilities of the people involved in lubrication.
2. A plot plant of the unit showing the location of all lubricated equipment.
3. The code color for most of the lubricants used in the refinery.
4. A list of the lubricated equipment giving manufacturer, type, size, and yard number of each item.
5. Lubrication instructions for operating personnel.
6. Lubrication instructions for mechanical personnel. These instructions should give a detailed description of the procedure to be used in properly lubricating the equipment. It is impractical, of course, to give instructions on each pump, motor, etc., separately, so similar equipment, requiring the same lubrication, are grouped together on a single sheet.

Flushing and Cooling Systems

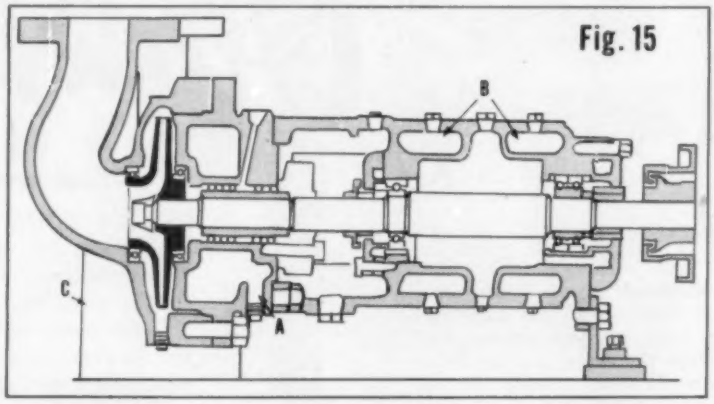
Many times centrifugal pumps must operate under conditions which will cause mechanical damage unless additional precautions are taken.

Take the case of a pump handling an extremely hot liquid. We must get rid of the heat absorbed by the pump or be confronted with two problems: overheating and uneven expansion of the various pump parts. This is done by cooling the parts most seriously affected.

Flushing systems are usually used to protect the wear rings and the mechanical seal or packing from excessive wear. This wear may be caused by gritty particles in the stock, the stock itself being corrosive, overheating, or ice forming between seal faces.

Cooling systems . . . The amount of cooling required depends of course on the amount of heat which we must dispose of. See Table 1 for the methods of cooling centrifugal pumps at various temperatures. We are usually concerned with cooling three parts of a pump: the stuffing box, bearing housing, and the mounting pedestal (see Fig. 15). The stuffing box is cooled to prevent the packing or mechanical seal from failing due to overheating. The bearing housing is cooled to prevent the bearings from overheating. The mounting pedestal is cooled to prevent unequal expansion which would result in misalignment of the pump with respect to the driver.

This material taken from process-training-program manual, Baton Rouge, La., refinery of Esso-Standard Oil Co.



IN THE CENTRIFUGAL PUMP shown above, three parts (A, B, and C) are cooled by the methods shown in the table below.

TABLE I—CENTRIFUGAL PUMP COOLING SYSTEMS

Parts cooled on centrifugal pumps:	Max. pumping temp.	Illustration	Method of cooling
Stuffing box	Up to 200° F.	.....	Line is run from pump discharge to stuffing box. A strainer is installed if the product is gritty. This also serves as a flushing line.
	200° F. and above	Fig. 15 (A)	Pump is supplied with a water jacket around the stuffing box. Water is circulated through this jacket.
Bearings	Up to 250° F.	.....	No cooling system is required.
	250° F. and above	Fig. 15 (B)	Pump supplied with a water-cooled bearing housing. Water is circulated through the housing jacket.
Mounting	Up to 450° F.	.....	No cooling required.
	450° F. and above	Fig. 15 (C)	Pump supplied with water-cooled pedestal. Water is circulated through the pedestal.

WIRE ROPE AT WORK

The Hamilton Dome Field is practically home grounds for Selby Spudder Service, Inc., Thermopolis, Wyo. Here's a well at Hamilton Dome that needed a hurry-up workover job, and a Selby team is shown setting up for drilling. At the time, the well was approximately 3200 ft deep; though a good producer, it was admitting too much water. Selby's assignment was to drill deeper and to bring in a higher percentage of oil.

A workover job can be harsh on the rotary line, and to guard against trouble, the drilling unit was rigged with ⅞-in. Bethlehem Purple Strand. This sturdy wire rope, Bethlehem's top grade, proved an excellent selection. Both on the job shown here and others that followed, it easily handled the long strings of drill pipe and stubbornly resisted wear.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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Reed Rock Bits

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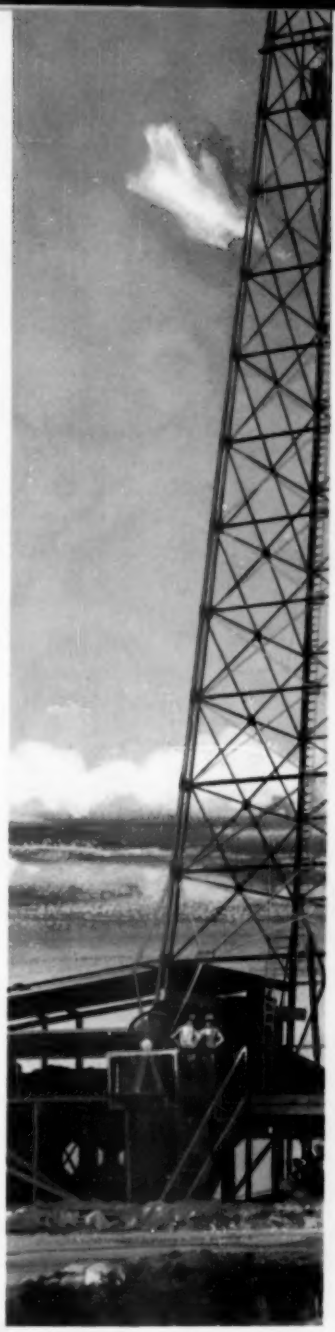


Reed introduced the *first* rock bit with roller bearing cutters unitized into a lightweight drilling head during the Oklahoma City Bonanza. Prior to this first bit with welded-in cutters and lightweight head known as the "Sport Model," all bits with rolling cutters were dressed at the rig and a 9-inch bit weighed about 350 pounds. But let's turn back the pages to the beginning of the Oklahoma City field and the era of wild gushers.

On December 28, 1928, the bit on the Indian Territory Illuminating Oil Company's No. 1 Oklahoma City well pierced a cement plug at 6,355 feet and the well blew in, producing 4,909 barrels of oil in the first twenty-four hours. This was it . . . the Oklahoma City Bonanza was on. The field expanded steadily to northward and for the first time a major metropolitan area was threatened by a vast oil field. Derricks, slush pits, and storage tanks invaded industrial and residential areas alike.

The field developed on spectacular proportions with newspapers carrying frequent headlines on sensational gushers. Most awe-inspiring of all these uncontrolled gushers was the "Wild Mary Sudik" which blew in with an estimated 200 million cubic feet of gas and 20,000 barrels of oil daily. "Wild Mary" rampaged for eleven days showering oil on farms for five or six miles about. Floyd Gibbons, famous war correspondent, broadcasted "Wild Mary's" antics twice daily to a radio-listening world. In efforts to control prorations in the prolific Oklahoma City field, national guardsmen were used on several occasions and it was variously described as "Turning the Oil Tide with Rifles" and "The Era of Gushers and Guardsmen."

Oklahoma City was significant as the first extensive area of "deeper" wells, made possible by the vast improvement in rigs and rotary equipment. Prominent on this list of improvements was the Reed "Sport Model" rock bit. Today, the greatest improvement in rock bit design for modern fast drilling requirements is the Reed Y Bit.

BEST IN 1932 . . .

Reed Sport Model Rock Bit with roller bearing cutters unitized into lightweight drilling head — 1932.

BEST TODAY . . .

REED Y BIT

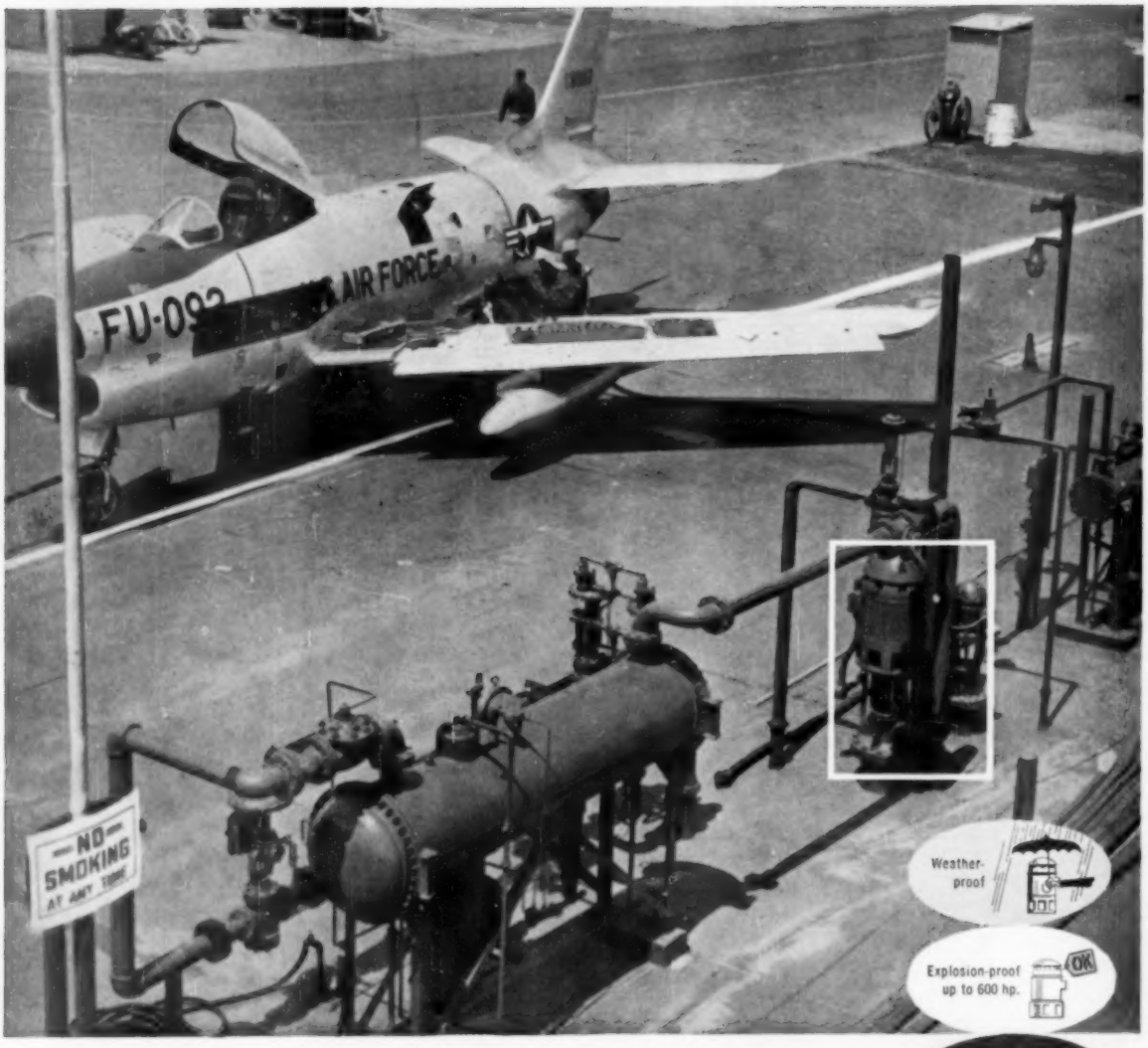
FREE REPRINT

This is the fourth of a series on the history of famous fields. To obtain your FREE 17 x 14" full color prints suitable for framing of the entire series, send your request to Department H, Reed Roller Bit Company.

OKLAHOMA CITY · 1932 As the field developed northward, rigs reared their crown blocks in school yards, slush pits were dug on playgrounds, and storage tanks were built in alleys. Hundreds of derricks were visible from the capitol steps. Rigs actually invaded the capitol grounds in 1936.

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS



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The installation is an Air Force jet refueling site. The motors shown are Louis Allis vertical solid-shaft explosion-proof units designed for petroleum-pumping service. The smaller ribbed unit is a non-ventilated 1 hp. motor used to pump fuel to the plane; the larger unit is a 30 hp. fan-cooled transfer-pump motor.

Both of these motors are weatherproof; they assure dependable service and long life under baking sun and in driving rain- or dust-storms. Louis Allis insulating varnish is sure protection against moisture or embrittlement, and sturdily resists even the effects of acids or alkalis in the extreme environmental conditions encountered in petrochemical service.

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Polyethylene Tape for Pipeline Protection

By Paul Reed
Pipeline Editor

TAPING OPERATIONS and the work entailed in crossing a thick network of pipelines in producing areas are the principal features of the Schedule 1 section of Natural Gas Pipeline Co. of America's construction project from Bridgeport, Tex., via Oklahoma to Fritch, Tex. The Schedule 1 section consists of 80 miles of 20-in. from the Bridgeport area to the vicinity of Healdton, Okla., laid by Eastern Pipe Line Contractors.

More attention has been attracted in the industry to the operations for applying polyethylene tape than to any other phase of the entire project. Company and contractor people from the pipeline industry have been coming to the taping work seeking answers for their questions.

Plastic Taping

How does the tape go on the pipe? What savings are possible by this technique—in equipment, manpower, and supervision? What appears to be the condition of the taped pipe after it is backfilled in the ditch?

On this project as well as on several others in the past year, taping is seen to be the cleanest, simplest, and most economical way to put protection on a pipeline.

Since the materials for a taping job cost about twice as much as those for one with coal tar, the field-application costs must be cut to make tape competitive. How is this done?

Taping Personnel

To begin with, the combined operations of cleaning and taping require a total of 19 men as compared with 40 to 44 men for a hot-coating operation including cleaning, priming, and coating. Here is the cleaning and taping gang lineup:

Cleaning gang: Five men (two operators and three laborers).

Taping gang: One foreman; one truck driver; three operators (one for wrapping machine, two for tractors); nine laborers (two for handling skids; one tape and paper latcher; one for preparing tape and paper; two carrying tape and paper, one handling the hoosier pole to steady the machine; one jeep boy for operating holiday detector, and one patcher).

One foreman can supervise three gangs which would require three foremen where hot coating would be used. Ordinarily the cleaning machine is 500 ft. ahead of the taping machine and backfilling is 1,000 ft. behind. (The backfiller was made by the contractor and mounted on a tractor.)

"How does the tape go on the pipe? What savings are possible by this technique—in equipment, manpower, and supervision? What appears to be the condition of the taped pipe after it is backfilled in the ditch? More attention has been attracted in the industry to the operations for applying polyethylene tape than to any other phase of the entire project . . ."

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A PRACTICAL INNOVATION was the use of farm tractor to tow the welding machines along the firing line. The tractor is fast and turns easily in a small space.

A boom tractor cradles the pipe ahead of the taping machine and another cradles the pipe into the ditch immediately after taping.

Saving of equipment compared with a hot-coating method includes use of boom tractors for lowering in kettles and tow tractor for moving the kettles.

No primer is put on the pipe ahead of wrapping.

There are two wraps—black polyethylene tape and felt—wound around the pipe by a wrapping machine specially designed for taping work. It looks like a coating machine without the coating features.

The polyethylene tape with adhesive on one side for binding to the pipe is of 12-mil thickness. A wrapping of 8-lb. felt is put on over the polyethylene tape for protection during handling and backfilling. Overlap is ¾ in.

In rocky ditch, additional protection against backfill damage is provided by rock shield and dirt padding. In the early stages of the job where there was considerable rock, a padding machine was used to convey and sift dirt from the backfill.

Sacks of "breaker" material—a clay mixture—were distributed in groups of six sacks each at points where it could be packed around the pipe and reinforced by snow fencing to within a foot of the top of the ditch. This stops flow of water down the ditch during rains when there would be danger of washing out and caving the ditch.

A roll of plastic tape, 15 in. wide and 800 ft. long, covers 180 ft. (lineal) of 20-in.-diameter pipe. A roll costs $74.50.

The average rate of taping on Schedule 1 has been 1,300 ft. per hour. The fastest taping has been 1,600 ft. per hour. The largest output in 1 day was 12,000 ft.

Condition of Pipe Taping

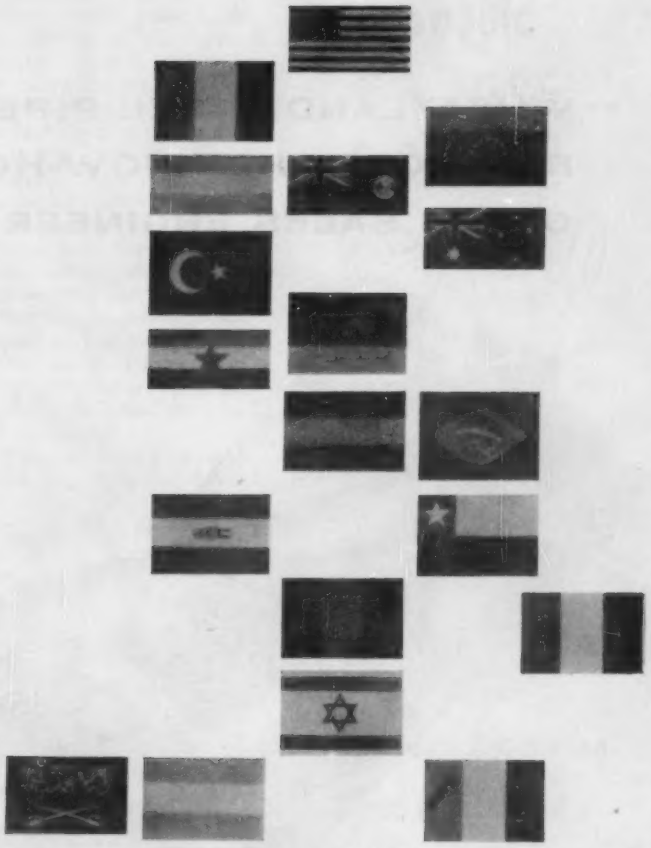
The plastic tape was observed to be applied smoothly to the pipe. There were no blisters or wrinkles seen when the author was watching taping operations. Taping results for the project were reported to be satisfactory for the project as a whole. It was said that care had to be used in applying tape when the weather was unusually cold or hot to avoid having wrinkled tape on the pipe. Attention was also needed during lowering in to avoid scuffing of the tape under the felt by scraping against the side of the ditch. (Pipe diameter 20 in., ditch width 32 in.) It was believed that a stiffer outer wrap could have prevented such scuffing. These were regarded as minor details which did not reflect on the value of the basic principle of plastic tape for pipeline protection, where the total cost of materials and application could compete with hot coatings which are established in the practices of the industry. A shielding felt with more reinforcing for greater protection would increase the total cost of taping.

Plastic tape is bought and warehoused by NGP and furnished to the contractor as needed.

Holidays are spotted by a detector operating at 7,500 volts.

Welding

The largest output of pipe gang was 196 stringer-bead and hot-pass



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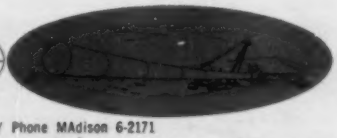

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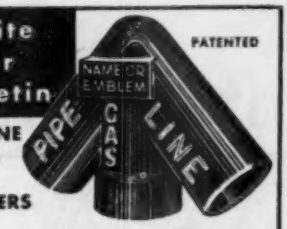

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welds for adding 40-ft. joints to the line totaling 8,900 ft. in 1 day. Progress was about a mile a day when the author visited the line.

A feature of the welding operations was the use of a big farm-type tractor with large rubber tires for towing welding machines. This could move quickly along the right-of-way and turn in a small space.

Eastern's pipe gang has been using two 250-amp. welding machines for stringer-bead welding and two of the same type for the hot passes. These are all mounted on two tractors, each of which drives on all six wheels. The welders in the pipe gang are all single-hand welders, for the contractor owns the welding equipment.

The firing line is a rig job for each welder comes with his own welding machine on his pickup. There have been five to eight welders on the firing line. Sometimes utility welders have been moved in to keep up the desired rate of progress.

Pipe for Schedule 1 is all 20-in.

Conventional procedures have been followed for hot-pass welding as well as for the other welding on Schedule 1. There was a different hot-pass procedure on the gathering line where one of two hot-pass welders only passed lightly over the stringer bead for stress relieving to prevent cracking while the second welder took the next step of cleaning the weld and finishing the usual hot-pass operation.

Passing Under Pipelines

Lowering in was impeded in traversing the old Healdton oil field where the pipe had to be laid under a large number of pipelines. In one ½-mile stretch, 13 tieins had to be made because of the density of the existing pipeline network. Rod lines for pumping wells from central powers were unhooked for certain hours of the day through arrangements made by the contractor. Some rod lines, however, continued to operate while back hoes were working.

Lines were located before ditching by a pipeline locator, loaned by the company to the contractor, which proved to be entirely reliable.

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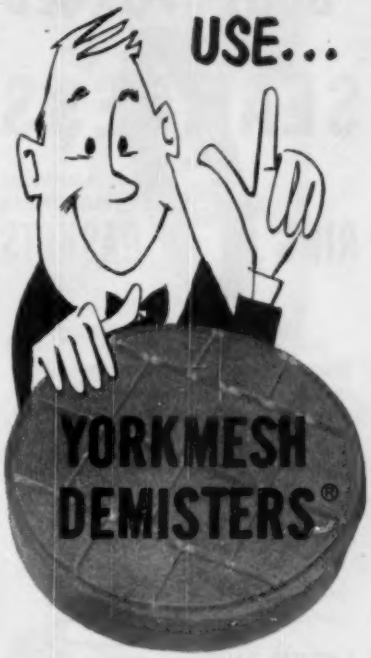

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Among the Drilling Contractors

Woolf & Magee, Tyler, Tex., are getting started on another Cotton Valley test for A. J. Hodges Industries, Inc., and Union Production Co., of Shreveport, in the Sugar Creek area of Claiborne Parish, North Louisiana. Location is for 1-B Sims Unit, in 32-20n-5w. It is the operators' third Cotton Valley test in the area. Drilling is to 10,000 ft.

Big Chief Drilling Co., Oklahoma City, has a deep wildcat operation under way for Shell Oil Co. in northwestern Wood County, northeastern Texas. The test, 1 Deas, is scheduled to go to 14,000 ft. for a look at the Smackover formation. Location, in the E. Esparsa Survey, is about 5 miles southeast of Yantis.

Johnson Drilling Co., Tyler, Tex., is on a new contract operation 5 miles northeast of Elkhart, in Anderson County, Texas. It is a 6,000-ft. Woodbine test with W. H. Bryant, of Tyler, as operator. Bryant's location is at 1-A Southern Pine, in the H. Main Survey.

T. C. Strain Drilling Co., Denver, is working on a new wildcat operation in southwestern Morrill County, southwestern Nebraska. It is a joint venture of Rock Mountain Oil & Gas Co. and the contractor at 1 Stark, in 23-18n-52w. Location is about 3 miles east of Olsen field.

Falco Drilling Co. is contractor on a rank wildcat operation Pratt-Hewitt Oil Corp. is starting about 8½ miles southeast of Hebbronville, in northern Jim Hogg County, South Texas. Location is on the operator's E. P. de Moreno lease, in Share H, Palo Blanco Grant. A 5,900-ft. test is planned.

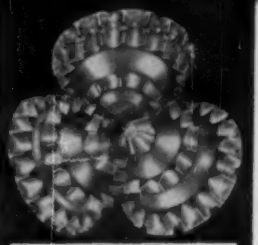
Nicklos Drilling Co., Houston, is putting a rig to work for Union Oil Co. of California on a deep wildcat test in northwestern Lafayette Parish, South Louisiana. Its location, at 1 Comeaux, in 9-9s-4e, is about 2½ miles northeast of the Ossum field, nearest production. Permit is for a 14,500-ft. test.

Canbridge Corp., Calgary, Alta., has the contract on the wildcat test Anglo Pacific Oil & Gas Co., of Vancouver, B. C., has scheduled in the Ketchum Creek area, in southeastern Alberta Province. Its location, in LSD 7, 14-4-6w4, is about 9 miles southwest of Craigower.

Woolf & Magee, Tyler, Tex., has three new contract jobs going in the Harrisonburg area, northern Catahoula Parish, eastern Louisiana. All are 4,800 to 5,000-ft. Wilcox tests. One is for Douglas Whitaker, of Shreveport, at 1 Louisiana Central Mineral, in 32-9n-6e, about 5 miles southwest of Harrisonburg. This is

CHECKING on a deep test R. & M. Well Servicing & Drilling Co., of Houston, has been drilling for F. A. Callery, Inc., also of Houston, on the north flank of the old Orange dome, in Orange County, Texas Gulf Coast, are, left to right: W. H. Neal and Dick Kirkpatrick, production superintendent and production manager, respectively, for the operator; Geneos Pete Cokinos, senior engineer, Texas Railroad Commission; and Herbert Almond, drilling superintendent, and Emmett Moor, one of the owners of the contracting firm. The well, 1 Walles et al, was drilled to 9,209 ft.

Around the world...



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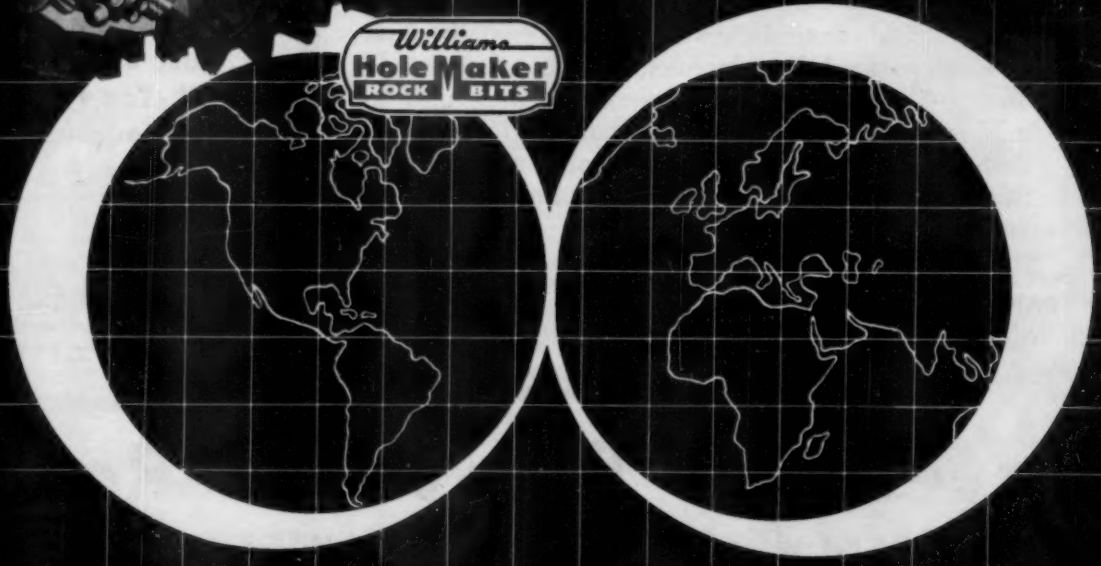

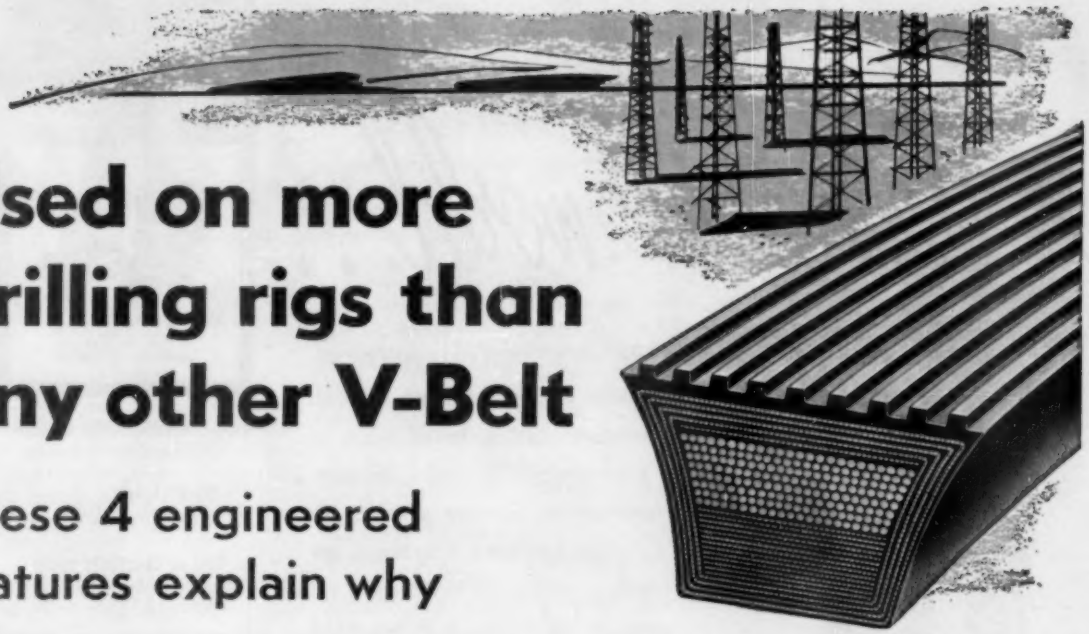

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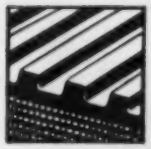

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about 4 miles southeast of Webb and about the same distance northwest of Tew Lake field. The other two are for Germany-Gulmon, of Natchez, Miss. One is at 1-A Prichard, in 36-10n-6e, about 2 miles northwest of town. The other, at 1 Prichard, in 17-9n-7e, is about 2 miles east of town. It is a southeast outpost for Harrisonburg field.

Haney & Williams Drilling Co., Los Angeles, has a new exploratory operation under way for Union Oil Co. of California on the north edge of the old Mountain View field, southeast of Bakersfield, in Kern County, California. The test, 71 Nassour, in 13-30-28, is scheduled to the Vedder sand, expected about 7,600 ft.

Steen Drilling Co., Houston, has another deep Edwards well under way for Gulf Oil Corp in the Fashing-Wiegand area, on the Karnes-Atascosa county line, in South Texas. It is Gulf's third well. The new operation is at 1 Keilner, about ½ mile northwest of Gulf's discovery well. Drilling is to depths below 11,000 ft.

Stewart & Gouger Drilling Co. is drilling a deep test for Argo Oil Corp. at a wildcat location 2 miles southwest of George West, in Live Oak County, South Texas. Argo has permit to take the test to 9,600 ft. Location is on its Frank Braslau lease, in Block A, George W. West Tranch Subdivision.

Wes Moore, Alice, Tex., has a rig working on a long stepout location southeast of Al Smith field, 4 miles northeast of Alice, in northeastern Jim Wells County, South Texas. It is a 6,000-ft. contract job for Mrs. James R. Dougherty, of Beeville. Location is about a mile from production. It is at 1 Embleton.

Hose-Austin Drilling Corp., Casper, Wyo., has a new contract operation under way in the Ragged Point area, in the northeastern corner of Musselshell County, Central Montana. Operator is Juniper Oil & Mining Co., whose location is at 1 Fournier, in 14-11n-30e. It is a 4,300-ft. Tyler test. Location is east of production.

Evangeline Well Service Co., is on a drilling job northwest of West Holmwood field, in southeastern Calcasieu Parish, southwestern Louisiana. It is a 4,000-ft. contract for C. H. Lawrence, of Dallas. Its location, at 1 Farmers Land & Canal, in 19-10s-7w, is about 1¼ miles northwest of the area's one well, completed in 1956 from a 10,550-ft. sand.

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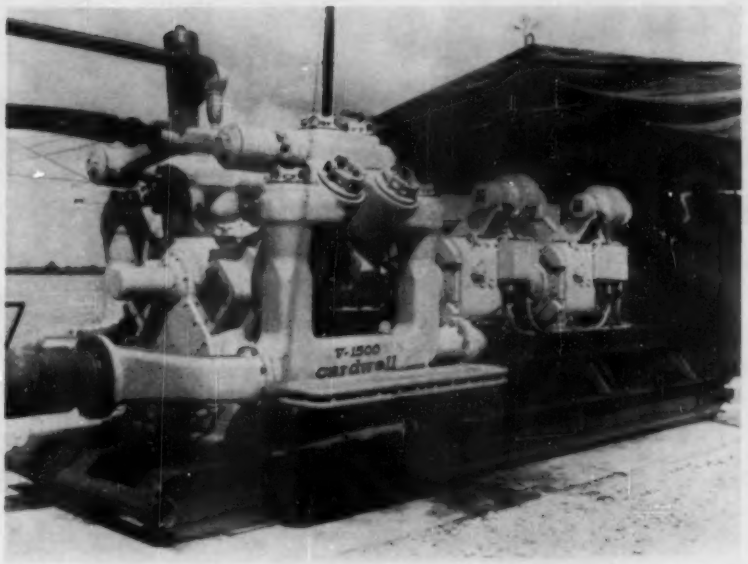

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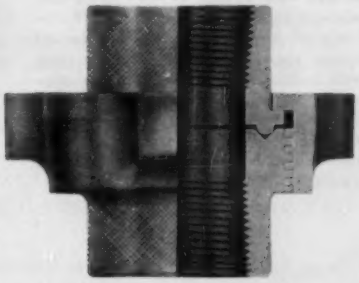

The maker recommends the union for steam, gas, mud, salt water, oil, and water at temperatures to 500° F. It comes in sizes from 1 to 10 in. for pressures of 2,000 to 6,000 psi. **Write or call: Double Seal Union Co., 1206 Nance Street, Houston, for details on Double-Seal union.**

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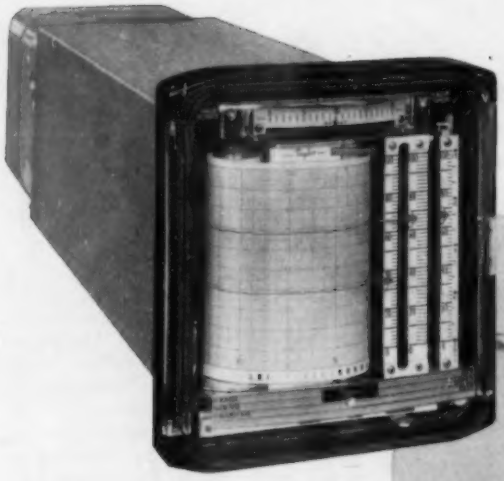

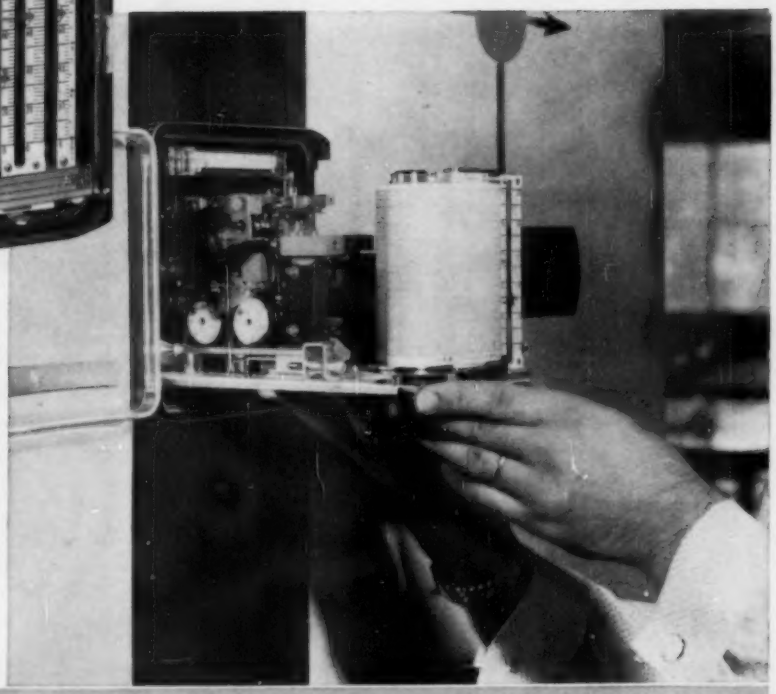

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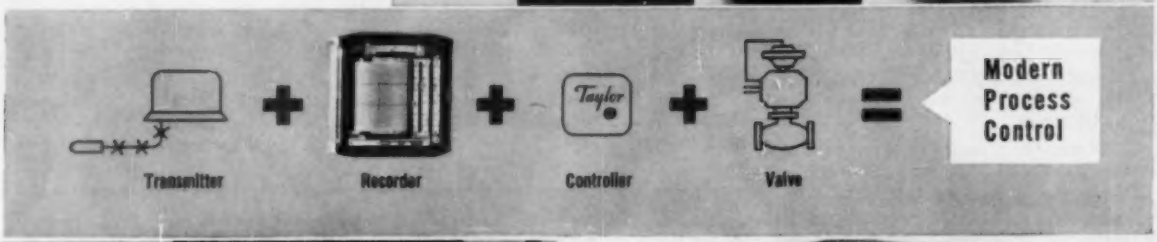

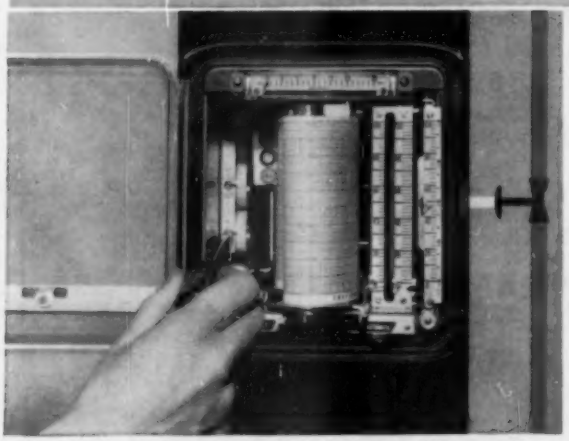

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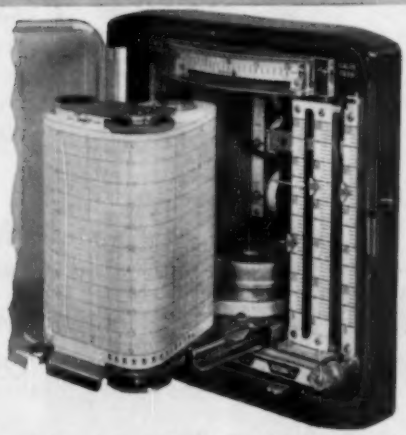

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. . . so Many Features in so Little Panel Space!

Taylor's new 90J Series TRANSCOPE* Recorder is a giant step forward in the development of convenience and compactness for modern instrument panels. No other recorder, regardless of size, puts so many features in so little panel space.

• **Front-of-Panel Control Settings** let you make adjustments easier, quicker, and better . . . from the front of the panel . . . while recording! You can clearly see what you are doing, and the results, because the record is continuous.

• **Stays on Automatic Control** while the recorder is removed for inspection. The unique Set Point Transmitter remains plugged in the case, providing continuous fully automatic control.

• **Complete Indicating Control Station** while recorder is removed. You see the variable. There's no need to shut down the process for instrument service or adjustments. Horizontal gage at top of recorder will show either process variable or air output to valve, as desired.

• **More Accurate Records.** Responsiveness to transmitter output is 0.1%; and because of the very small pneumatic displacement of the input capsule, the response is practically instantaneous. You see more minute process changes, so you can make optimum control setting. SERVOMATIC power pens assure accurate pen position.

• **Interchangeable Components** — all major assemblies, components and unit parts are completely interchangeable. Both the TRANSCOPE Recorder and Controller may be changed in the field from simplest to most complete form.

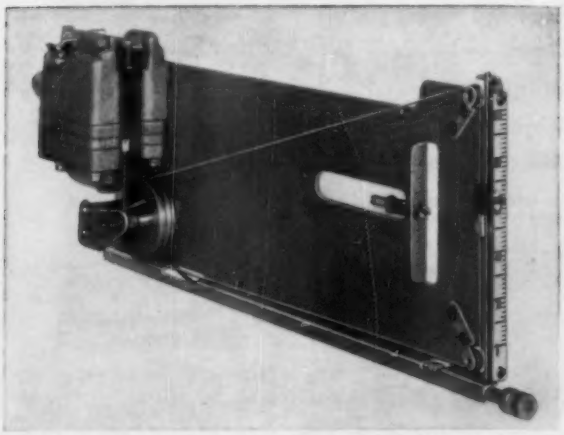
• **Receives Three Variables** to be recorded or indicated; has a set point transmitter, an automatic-to-manual switching lever, a cascade or process-output indicator, and many other features . . . all in a compact case.

• **Complete Cascade System** — a complete master-slave combination, in a smaller case than ever before. Perfect for direct control of composition, as well as the usual cascade control applications.

For further information about this revolutionary new recorder, see your Taylor Field Engineer, or write for **Form No. 98282.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Trade-Mark



Exclusive "Set Point Transmitter" allows continuous automatic control during recorder removal. The plug-in transmitter assembly may be removed and the control valve sealed in operating position. No need for process down time for instrument inspection or servicing.

Taylor Instruments
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ACCURACY FIRST

VISION · INGENUITY · DEPENDABILITY

SHOWCASE . . .

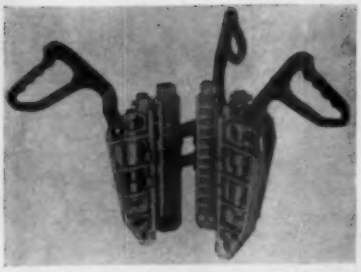
New Equipment

Rotary Slips Cut Crew Fatigue

The new lightweight rotary slips are designated Type G Bantam. They're designed to minimize crew fatigue without sacrificing rugged construction.

Manufactured for all standard types and sizes of rotary tables, they come in three body sizes—2⅞, 4½, and 5½ in. The 4½-in. size weighs only 96 lb. A unitized design assures uniform setting of the multibody segments in any rotary table. Rated capacity is 7,500 ft. of 4½-in. drill pipe.

These slips are so constructed that a toggle action under torque provides a means of holding drill pipe and tubing, thus allowing breaking out and making up of joints wth less use of backup tongs. The vertically grooved body backs are hardened to insure extra strength and toughness. They allow the slips to release easily from the master bushing when weight is removed.

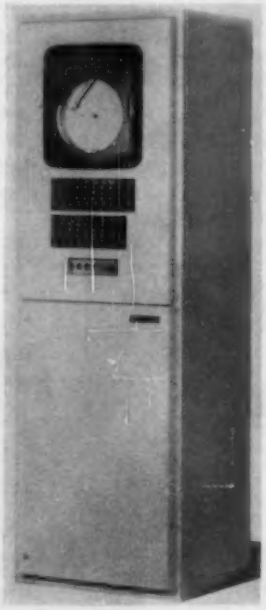


The simplicity of design allows for quick and easy changing of the liner segments by removal of only one bolt in each body segment. **Write or call: Baash-Ross Tool Co., 5306 Clinton Drive, Houston, for details on Type G Bantam slips.**

●

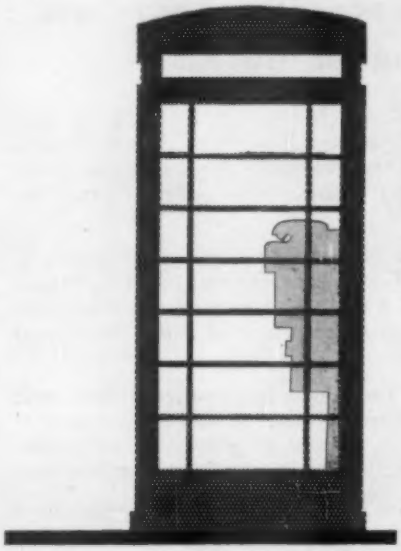
Control System Uses Only Two Wires

The telemetering and supervisory control system uses the same pair of wires for both incoming data signals and outgoing supervisory commands. It is particularly suited for such continuous operations as pipeline systems and power and water-distribution systems. The basic system can handle up to 165 on-off type of controls, 17 telemetered analog signals, or combinations of both.



The high-capacity use of one pair of wires, leased or private, is accomplished by synchronous time-division multiplexers.

In a basic system, one multiplexer samples measurements and conditions at a remote station and also, on direction from the master station, as-



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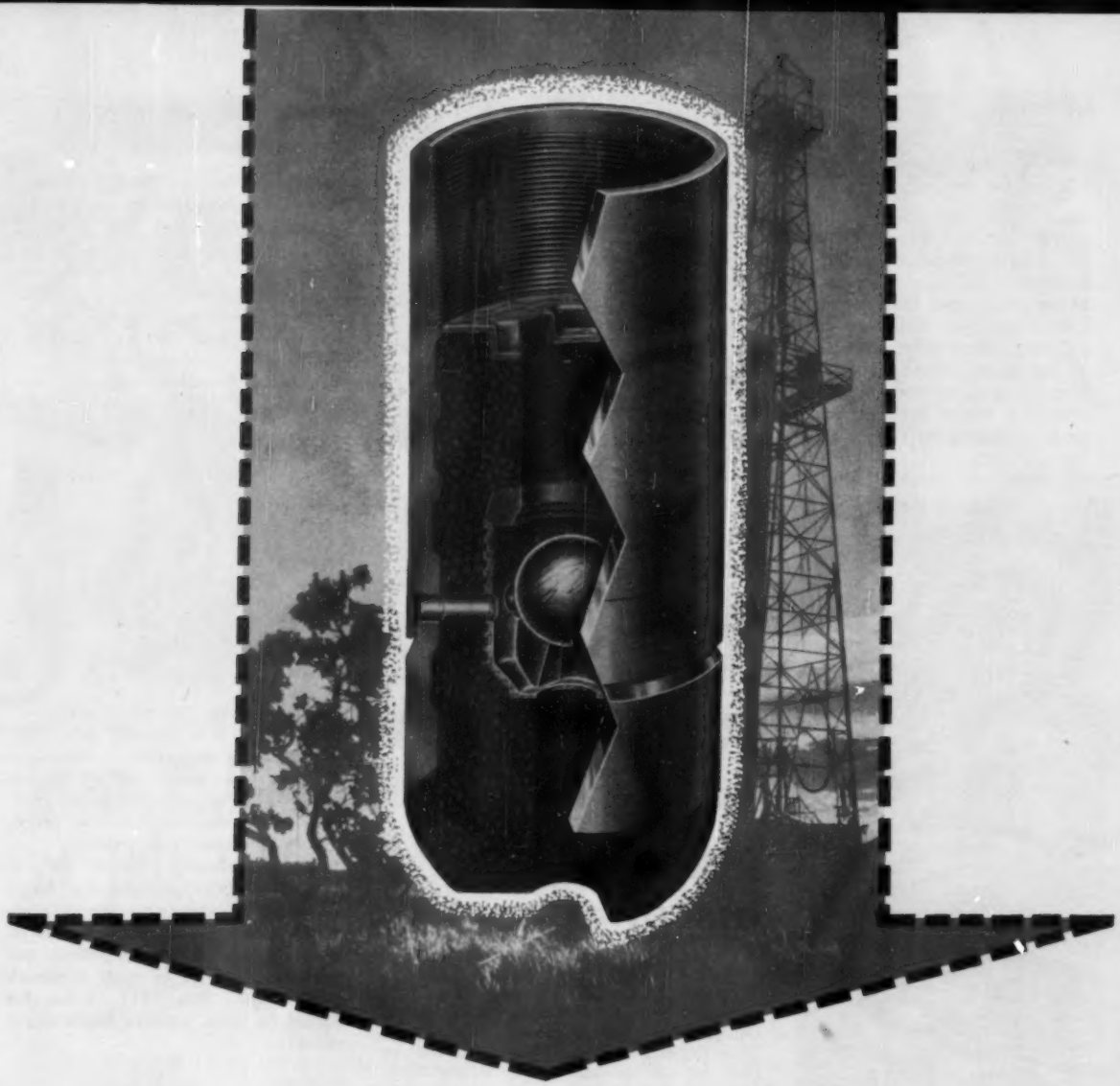

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The preponderant use of Larkin Floating and Guiding Equipment is a natural result of its years of dependable performance.

Experience brings confidence—and that's why thousands upon thousands of wells each year are cemented through Larkin Equipment.

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New Equipment

signs supervisory commands to the proper control devices. The other multiplexers, located in the master station, assign incoming data signals to the proper indicators, recorders, or alarms and also distribute command signals to the remote station.

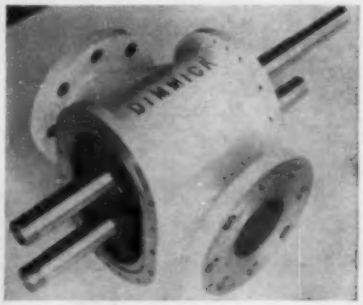
The multiplexers enable one economical communications link and a relatively small number of system parts to handle large data loads.

Several automatic self-check features have been incorporated into the system. Synchronization and calibration checks are made once each second and adjustments made automatically, if necessary.

The system is compatible with commercially available d.c. transducers at input and with all types of d.c. meters and recorders at output, as well as data-reduction and print-out equipment. **Write or call: Applied Science Corp. of Princeton, P. O. Box 44, Princeton, N. J., for details on telemetering and supervisory-control system.**

Rotary Pump Handles Water, Abrasives

The pump handles fluids containing 70 per cent solids the maker reports. In the new Dimmick 3-in. positive-displacement rotary pump, as the impellers unmesh, a vacuum is produced. The ports are designed so liquid is spread across the full width of the impellers. Liquid velocity is coordinated with impeller speed.



Self priming, the pump has positive suction, is completely reversible.

The casing and other castings for the pump are made of Meehanite metal to allow high discharge pressures. The impellers are Neoprene, Hycar, or natural-gum rubber.

One outstanding feature of the pump is the heavy volume of material moved at a moderate number of revolutions per minute, the maker says. About ½ gal. of liquid is pumped per revolution. **Write or call: Dimmick Pumps, Inc., Box 9517, Tulsa, for details on 3-in. positive-displacement pump.**

●

Transmitter Converts Variables to A.C.

Based on the use of a differential-transformer transmitter and an electronic receiver, the transmission system measures such variables as pressure, differential pressure, liquid level, temperature, and mechanical motion. It then converts them to proportional a.c. voltage signals. These a.c. signals are transmitted continuously and instantaneously to the remote self-balancing receivers.

A miniature type, the receivers are interchangeable indicating or 3-in. strip-chart recording types. They are said to be ideal for use in centralized instrument or graphic panels. They occupy a 5-in.-sq. panel space.

Using no vacuum tubes, the transmitters are available with an explosionproof housing for hazardous areas. **Write or call: Bristol Co., Waterbury 20, Conn., for details on electronic transmission system.**

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To meet the specialized needs of oil and gas men the Royal Bank maintains an Oil and Gas Department in Calgary. This department is a clearing house for the latest on-the-spot information, channelled in from branches operating in all proven fields and in many areas that are new and promising. For fast, informed banking service, geared to the requirements of the industry, call on the "Royal" —Canada's oil bank.

Write to The Royal Bank of Canada, Oil and Gas Department, 409 Eighth Avenue West, Calgary, Alberta, for a list of current *"Oil and Gas Bulletins"*. These "Bulletins" are revised constantly, will bring you up to date on regulations, tariffs, oil and gas financing, basic statistics, and kindred subjects.

We do not provide information on oil securities.

572

THE ROYAL BANK OF CANADA

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Over 900 branches in Canada, West Indies, Central and South America.
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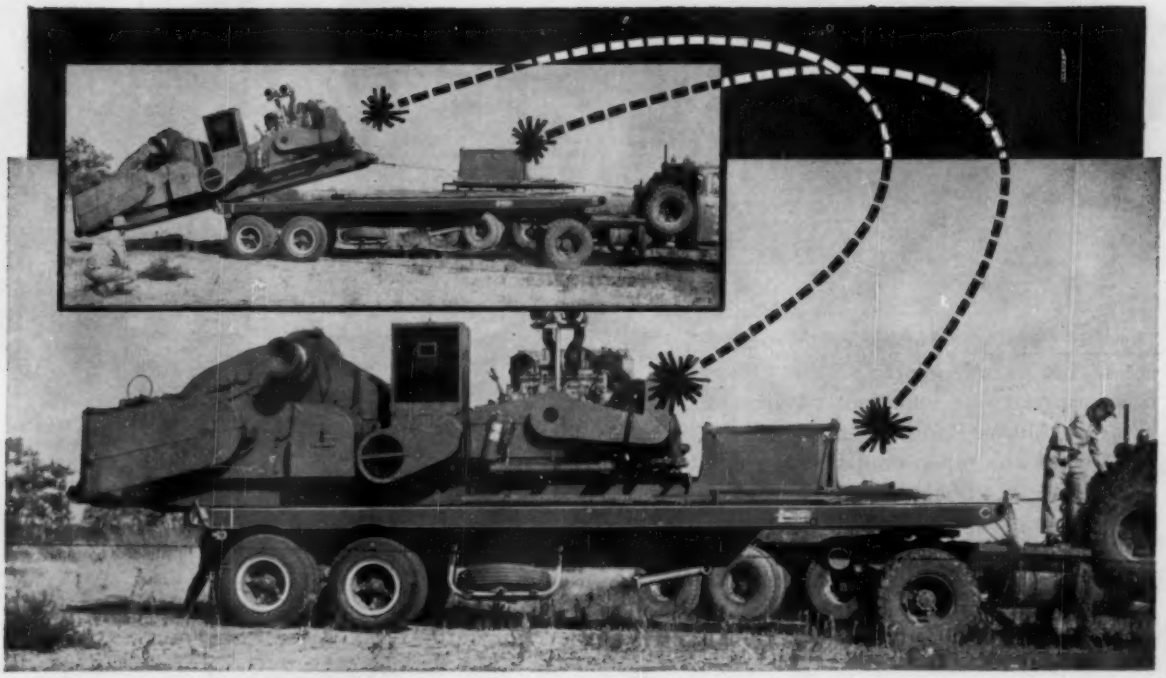
Total Assets Exceed 3½ Billion Dollars



Even 75,000 Pounds Doesn't Bow the Back of This 9,600 Pound LOADCRAFT 808...

LOADCRAFT'S 808 answers the industry's demand for a lightweight trailer... made to carry that extra heavy payload. This new heavy-duty oil field trailer actually weighs less than conventional trailers... yet can carry 5 TONS more payload. This new trailer is made entirely of special formula 808 steel... the greatest weight to strength ratio ever developed in oil field trailers. The main frame is full 18 inches deep and the outer rail is 9 inches. It is designed so when nose loading with the ***LOADCRAFT*** 808, the deep frame rests firmly on the ground to give three point stability... it has 7½" rolling tail pipe with self-aligning bushings for rear loading... heavy-duty rear bumper and the new rocker beam tandem. The ***LOADCRAFT*** 808 gives more payload per trip... requires less trips per job... pulls easier – uses less gasoline... and you pay no more for ***LOADCRAFT*** 808 than for an ordinary trailer. The ***LOADCRAFT*** 808 is the finest oil field float ever produced!

DEALER INQUIRIES INVITED

Spencer-Safford
LOADCRAFT INC.
AUGUSTA, KANSAS

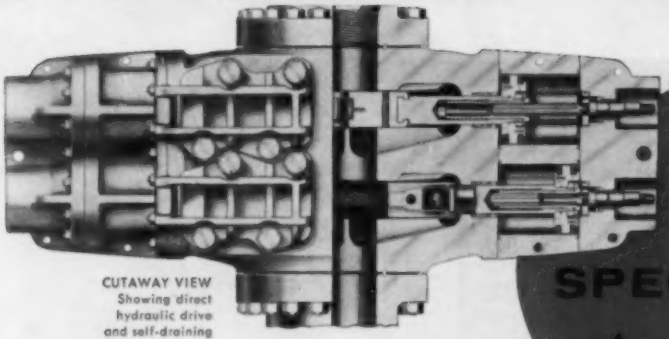
Please send me more information on the Loadcraft 808 Trailer. I am a user____ dealer____.

NAME_____

ADDRESS_____

TOWN_____

STATE_____

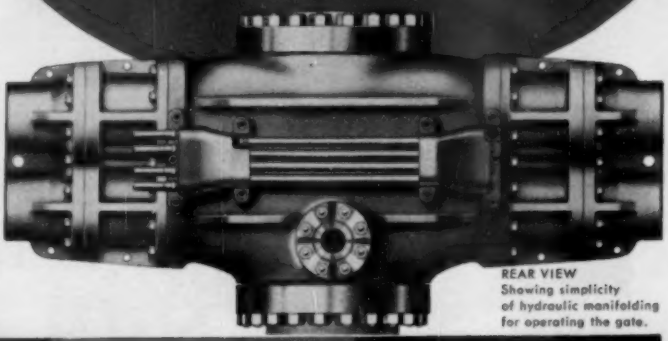


CUTAWAY VIEW
Showing direct hydraulic drive and self-draining ram compartments.

for UTMOST VALUE in Cellar Control Gates—

SPECIFY—and GET—

These SHAFFER Features



REAR VIEW
Showing simplicity of hydraulic manifolding for operating the gate.

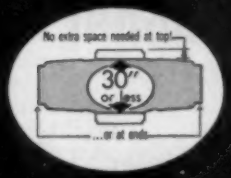
There is a big difference in cellar control gates. And to fully appreciate that difference, compare the important advantages you get in Shaffer Hydraulic Gates with the features of any other similar equipment. You'll find that Shaffer tops the field in advanced engineering... in actual performance... in basic value received per-dollar spent. So to make certain you get the best in cellar control gates, specify—*and make sure you get*—these Shaffer advantages...

specify CONVENIENCE!

Rams must be changed frequently during the life of a well, and no other unit equals Shaffer in ease of changing rams. Simply open two doors in the side of the gate, slide out the ram assembly, change rams, slide the assembly back in place and bolt the doors. Closing the doors automatically aligns the rams for proper operation.

What's more, Shaffer rams can be changed with equal ease whether the pipe is in or out of the hole!

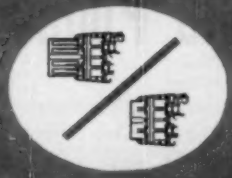
specify COMPACTNESS!



Again its Shaffer, because Shaffer Gates are not only unusually compact, but no extra space need be allowed for expanding the gate to change rams.

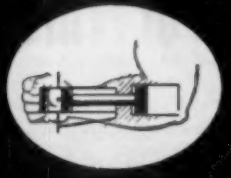
Even in sizes as large as 13⅝" (12"-Series 900), Shaffer Double Gates require only 30" height—Single Gates only 18". Smaller sizes even less. And length and width dimensions are equally compact!

specify ADAPTABILITY!



Once again its Shaffer, because you get the type of locking shaft you prefer. Some operators like the extra compactness of a *Non-Rising* Shaft. Others like the quick indication of ram position they get with a *Rising* Shaft. Take your choice with Shaffer because Shaffer provides both types. And both have built-in body extensions to protect the shaft against damage!

specify POSITIVE DRIVE!



When emergencies threaten you want quick, positive closing action in your control gates. And you get it from Shaffer because the operating cylinders are *directly* behind the rams. There are no yokes, no complex connections between piston and ram. Therefore, you not only get greater dependability, but also fewer parts, simpler maintenance!

There are many other "Extra Value" advantages built into Shaffer Hydraulic Gates... such as *Completely Enclosed Design* (no exposed moving parts), *Self-Draining Compartment Bottoms* (no detrimental mud and sand interferes with free ram travel)—and still others. Get the complete story from your nearest Shaffer representative—or write direct!

Send For Your Copy of the Latest Shaffer Catalog!

See the Shaffer Section of your Composite Catalog!

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HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

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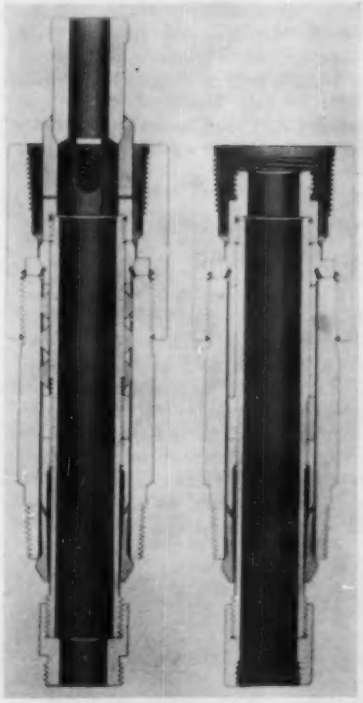
FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 546
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
HOUMA, LOUISIANA, Shaffer Tool Works, Post Office Box 872
EXPORT SALES OFFICE Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

35 years OF OIL TOOL LEADERSHIP!

New Hold-Down For Permanent Completions

The opening through the shoe permits the use of permanent completion tools through it, the maker reports. The sealing arrangement has a replaceable stainless-steel sealing ring and reversible stainless-steel sealing-ring seat. It can be used on any type of API rod pump.



If the sealing-ring seat, a part of the tubing assembly, becomes damaged or leaks, an effective seal can be obtained without pulling the tubing. The rod assembly is so designed that, by replacing the spacer ring on the hold-down lock body with three-ring type of seating cups, the seal is transferred to the seat support nipple. The sealing ring and sealing-ring seat serve as a no-go ring and support the load. **Write or call: Pacific Pumps, Inc., one of the Dresser Industries, 5715 Bickett Street, Huntington Park, Calif., for Bulletin 203.**

●

Slip Ring Solves Special Problems

On Model R series slip rings, the solid coin-silver conductors and pyrex-glass inserts for circuit interruption are imbedded in a rugged matrix of nonnutrient epoxy plastic, reinforced with glass fiber.

Conductors are rated for continuous operation at 20 ma., 300 volts with a low noise level. Transient voltages to 1,500 volts may be tolerated and insulation between rings and mounting structure is not less than 5 megohms under specified environments.

Vibration, shocks, and other requirements of MIL-E-5272A are met. Long life at high rotational speeds under any natural combination of environments is featured. Nickel-rhodium-plated slip-ring surfaces, greater current-carrying capacity, and other variations can be incorporated if desired. **Write or call: Servonic Instruments, Inc., 640 Terminal Way, Costa Mesa, Calif., for details on Model R series slip rings.**

NOW

100% Year 'Round Operation of Rising Stem GATE VALVES

Eliminate the costly hazard of rising stem gate valves that won't open or close — install . . .

DELTA VALVE STEM SHIELDS

Positive protection against grit and grime, corrosion due to salt water, fumes, acids, and damage by the elements. Heavy, transparent plastic enables you to always see *position* and *condition* of valve stem. Sizes for any rising stem gate valve. Installed in a jiffy. Don't wait until calamity strikes — order your DELTA SHIELDS today! Give valve sizes.

For additional protection use

DESCO VALVE STEM LUBRICANT

This Type S-100 lubricant is a special compound for protecting and lubricating threads and stems of gate valves. Prevents rust, corrosion and icing up. Easily applied with brush. Packed in 1- and 5-lb. cans.

DELTA-DESCO

WRITE FOR CATALOG

The Only Complete Valve Lubrication Company

VALVE LUBRICANTS AND EQUIPMENT

Color Coded Lubricants • Hand Guns
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SHOWCASE . . .

New Equipment

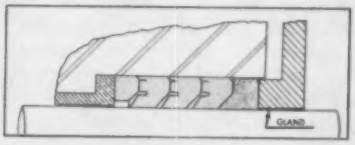
Pump-Packing Has J Design

Called Utex-J, the new pump-packing design is said to increase the life of rods and packing in many petroleum services. It also has wide application to hydraulic equipment. At present, it is being tested for polish-rod applications, the maker reports.

It incorporates a flexible lip, noncrushable construction, and an outside diameter that seals in worn boxes, according to the maker. The same basic J design is made up in a variety of formulations.

Style 740 fluid piston-rod packing for duplex piston-type slush pumps uses only three seal rings per rod. Style 742 is designed for plunger type of pumps handling mud, oil, sand-frac, acidizing solutions, and similar liquids. It also uses only three pressure rings with thermo-setting phenolic adapters and bearing rings to support the plunger and packing.

Style 835 is a noncrushable, nonadjustable packing for plunger type of pumps handling fresh and salt water, oil, propane, butane, naphtha, and other chemicals. It employs pressure

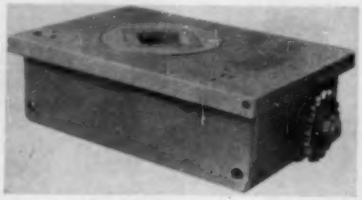


rings, thermosetting phenolic top and bottom adapters, and bearing rings where needed. Pressure ranges go up to 14,000 psi. in these applications. **Write or call: Universal Packing & Gasket Co., 5200 Clinton Drive, Houston 20, for details on Utex-J packing.**

●

New Rotary Offers Easy Handling

The new Type A-205 rotary machine is designed to replace the MS-20½ and the SHS-20½ National rotaries. It has a 20½-in. opening with a 53½-in. API spacing for the sprocket mounting. The rotary's rectangular shape simplifies installation in the derrick substructure and permits rig flooring to be fitted up flush with the table top on all four sides for safe working areas.



A cartridge-type pinion-shaft assembly permits removal of the whole unit by means of a bolted end plate. This assembly provides permanent alignment of bearings and an easy means of adjusting the pinion with the gear without disturbing alignment.

A unitized table and bearing assembly has improved and simplified the bearing assembly. The lower race of the main bearing acts as the upper race of the holdown bearing.

A direct table lock consisting of evenly spaced recesses or notches around the outer perimeter of the table and two independently operated locking pawls at the sprocket end of the rotary prevent rotation in either or both directions.

Approximate over-all dimensions of the A-205 are 93¾ in. by 56½ in. with a depth of 26 in. It weighs about 10,500 lb. **Write or call: National Supply Co., 2 Gateway Center, Pittsburgh, for details on Type A-205 rotary machine.**

ARCCO
NOW SPECIFIC GRAVITY RECORDING OF LIQUIDS AT ANY DISTANCE
RECORDING TRANSMITTER
Accurate long-distance transmission of specific gravity recordings is no longer a problem with the new Arcco-Anubis Metameter Recording and Transmitting Liquid Gravitometer. This instrument combines the mechanism of the standard Arcco Liquid Gravitometer with a metameter telemeter transmission system which records and transmits the specific gravity record to control room or other remote location. The interconnecting line may be any two-wire electrical circuit or its equivalent: private wires, telephone circuits, carrier current channels, or radio (VHF or UHF).
The range of the standard instrument is .15 or larger, but instruments with ranges of .10 or .05 can be supplied. Specific gravity charts are available for many gravity ranges, and special degree A.P.I. charts can be furnished at slight additional cost. Request Bulletin No. 111-R-3 for complete details.
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Send for Bulletin 111-R-3

SHOWCASE . . .

New Literature

Shock-Free Remote-Control Line Valves for 3 to 10-in. oil, water, or gas lines, are reviewed in new Bulletin 650. Designed for working pressures to 150 psi. and temperatures to 150° F., the valves are reported to be particularly compact, lightweight, and easy to service in the line due to accessibility of simple unit-built assemblies. The valves were developed primarily to protect lines, pumps, and other equipment against damage from shutoff shock. The bulletin illustrates the various valve sizes, operating principles, internal assemblies, and details dimensions and specifications. **Write or call: Ralph N. Brodie Co., San Leandro, Calif., for Bulletin 650.**

●

Physical Properties Booklet F-6136 is available and is a guide to Union Carbide Co.'s products and services. The latest physical-property data are presented on more than 350 organic chemicals in the 28-page booklet. Fifty new chemicals introduced by Carbide since the previous edition of the booklet are featured. Viscosity-index improver D and Crag Sevin experimental herbicide are two of the new products described in the section on chemicals for special applications. For easy reference, other chemicals are arranged by related chemical groups with condensed application data. **Write or call: Union Carbide Chemicals Co., 30 East Forty-Second Street, New York 17, for Booklet F-6136.**

●

Preset Valve-Control Compensating Springs — designed to assure tight valve seating—are described in new Bulletin 4-57. The Type SA Limi-Torque valve controls described are equipped with disk-type compensating springs that automatically assure a tight valve seat. For use in parallel or series, within fixed limits, these springs provide the desired compensation, the maker says. They are available in weatherproof and explosionproof construction. Valve-control ratings and a parts list are carried in the bulletin. **Write or call: Philadelphia Gear Works, Inc., Erie Avenue and G Street, Philadelphia 34, for Bulletin 4-57.**

●

PH-125 Neutron-Neutron Log provides a more accurate evaluation of formation porosities, according to the maker. Facts about the PH-125 N/N

With expanded storage capacity . . . INCREASED FIRE HAZARD?

Although greater storage capacity can spell big advantages in marketing, it is certain to bring an increase in fire hazard . . . particularly where flammable liquids are stored. Be sure your fire protection program grows with your capacity. Ask National Foam for expert recommendations.

NATIONAL FOAM System, Inc.
West Chester, Pa.

NATIONAL FOAM FIRE PROTECTION SYSTEM

The only company exclusively engaged in the design, development and manufacture of foam fire protection equipment and chemicals.

THOMPSON
SAND RESISTANCE
OIL WELL PUMPS

TRAVELING PLUNGER ROD TYPE BOTTOM HOLD-DOWN PUMP STANDARD SIZE

Figs. 400P, 600P, 700P, 800P

Single or double, self-aligning, combination cup and plunger or all-metal traveling plunger type, pumps made in four sizes: regular 1½", 1⅝" oversize, 2" regular and 2⅛" oversize bore. These pumps seat in API seating device. In very sandy wells, or when tubing is out, we recommend our SAND HOUSING MECHANICAL SEATING SHOE, which prevents sanding in of pumps as sand can be pumped and the pump pulled at any time by our sand flushing arrangement.

TOP HOLD DOWN INSERT ROD PUMP

Standard Size, Figs. 400T, 500T

Self-aligning double plunger insert pumps. Made in three types: combination cup and single plunger; combination cup and double self-aligning type; and metal-to-metal double plunger self-aligning type. All are equipped with Regular or Extra Long Alloy Plungers, ground individually to fit the barrels, assuring longer life on both pump and surface equipment.

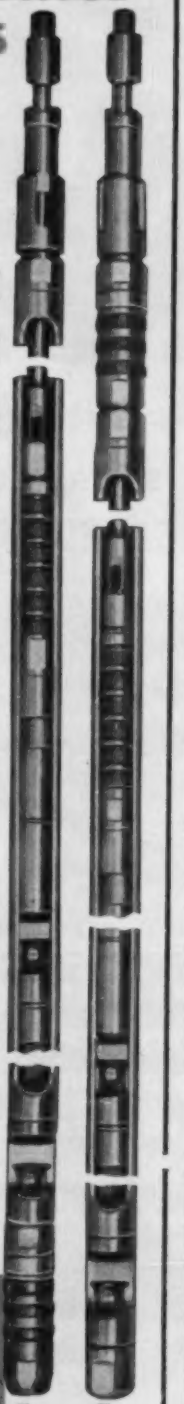

Fig. 400P 600P 700P 800P

Fig. 400T 500T

THOMPSON PUMP COMPANY
DRAWER 591
OKMULGEE, OKLA.

WHEN SPECS CALL FOR...

STEEL PLATE

custom fabricated on the West Coast

Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.

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THE OIL AND GAS JOURNAL
READER SERVICE DEPARTMENT
P. O. Box 1260 Tulsa, Okla.

have been published in two new technical handbooks. Thirteen performance charts on the PH-125 in the books provide an easy comparison with published performance charts on other types of similar instruments. In boreholes not containing liquid, the PH-125 N/N log retains its high sensitivity to formation porosity. **Write or call: Perforating Guns Atlas Corp., Box 14524, Houston 21, for "Porosity Evaluation Charts for PH-125 Logs" and "These Charts Speed Porosity Evaluation of Radiation Logs."**

●

"Cathodic-Protection Cables for Maintenance of Underground Pipelines and Other Buried or Underwater Metallic Structures" is the title of new technical Bulletin RCP 1110. Two types of cathodic-protection cables are described and illustrated in detail in the four-page bulletin. One consists of a polyethylene insulation with an over-all jacket of polyvinyl chloride (PVC) for added mechanical and flame resistance. The other type features an extra-heavy wall of all-polyethylene insulation. Both cables are available with either copper or aluminum conductors in AWG sizes 8 through 4/0. Diagrams of typical underground installations are included. Charts for both cable types show the AWG conductor size, the number of wires in each, insulation and sheath thickness, approximate o.d. in inches, and the normal weight and approximate d.c. resistance of both copper and aluminum. **Write or call: Rome Cable Corp., Rome, N. Y., for Bulletin RCP 1110.**

●

Power Transmission Belting—made of polymer and chrome-tanned leather—is discussed in a new three-color catalog. The catalog contains sections on significant applications, description of the belt, selection of the proper belt type, tensioning and maintenance, and bearing-load reduction. **Write or call: Extremultus, Inc., 405 Lexington Avenue, New York 17, for transmission-belting catalog.**

●

Liquid Meters for Measuring Liquid Propane, Liquid Butane, and Liquid Propane - Butane Mixtures are described in new eight - page Bulletin OG-412. In addition to product descriptions and illustrations, the new bulletin features a two-page drawing-illustrated explanation of the over-all dispensing system which is designed to insure that the product remains in a liquid state throughout metering.

A FEW DOLLARS IN

AMPCO® SAFETY TOOLS

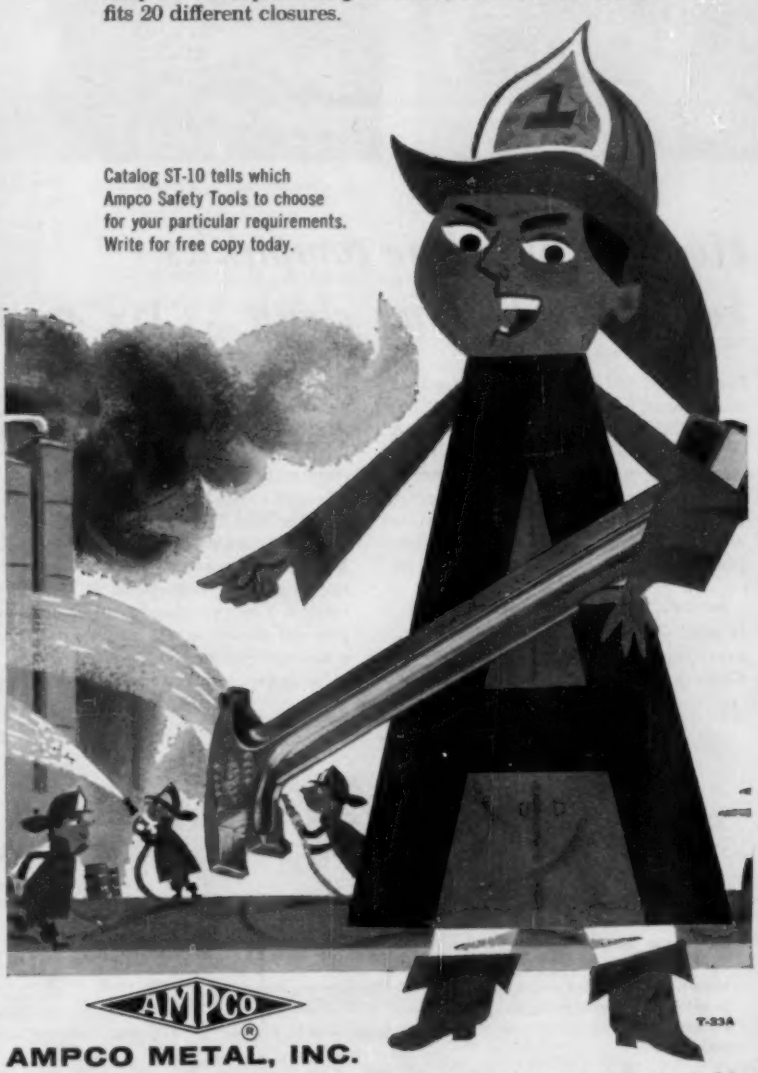
COULD HAVE PREVENTED THIS!

What if fire or explosion hit your plant tomorrow? Think of the damage that could be done — the lives and the time that could be lost! Unless you have money to burn, it's simply too expensive to gamble on going without the low-cost protection of Ampco Safety Tools in hazardous areas.

Factory Mutual Laboratories approve Ampco Safety Tools for use in any location where a hot spark could mean paralyzing disaster.

Ampco has the world's most complete line of safety tools — more than 400 types and sizes — including the Ampco All-Purpose Bung Wrench (shown below) which fits 20 different closures.

Catalog ST-10 tells which Ampco Safety Tools to choose for your particular requirements. Write for free copy today.



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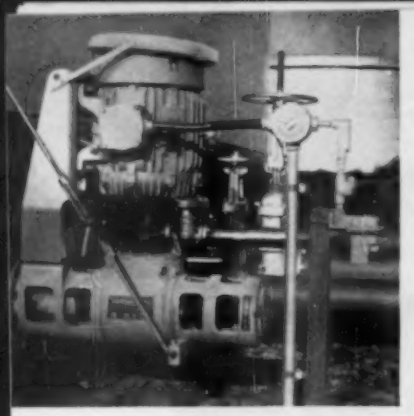
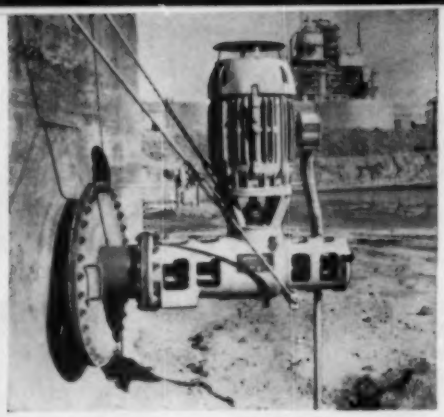
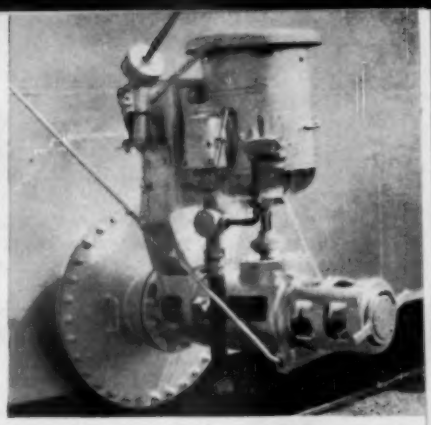
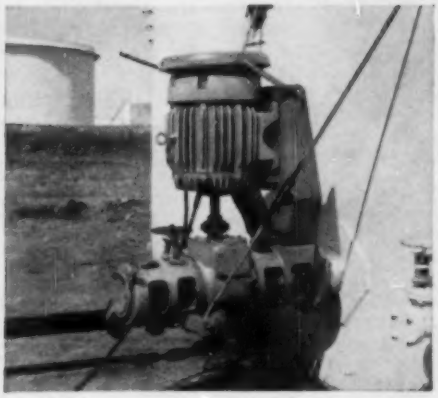
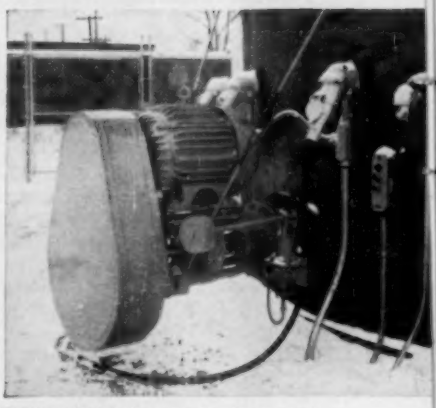
Dept. OGJ-12, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif. • In Canada: Safety Supply Co., Toronto, Ont.

YOU CAN GET LIGHTNIN MIXERS for controlling bottom sediment in any tank, regardless of capacity.

How 50 pipe line companies keep tank bottoms clean . . . **by pressing a switch**

More than 50 independent pipe line companies, and some 35 leading producers and refiners, have found an easy way to say good-bye to sludge cleanout costs in crude storage tanks.

Uniform crude; no sludge pile-up; dramatic savings—these are the results when you control sediment by flipping the switch on a LIGHTNIN Mixer.

Saved: $1,000 per tank per year

If your tank cleaning costs are about average, you lose from $5,000 to $8,000 every time you clean out an 80,000-barrel tank. These cost figures include a conservatively estimated $2,000 in marketable oil and wax lost in the bottoms. Often, this loss runs much higher—as high as $6,000 in some cases.*

When you install LIGHTNIN Mixers, you eliminate sludge buildup for good. You can keep sediment suspended in the crude, or resuspend it if it has settled. You can blend crude stocks to prevent stratification, and to dispatch a uniform crude.

Savings, overall, are on the order of $1,000 per tank per year.

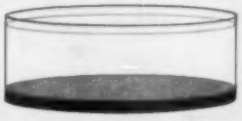
As a bonus, you keep full holding capacity of your crude tanks ready for use when you need it. You gain as much as 12% more storage capacity —without adding a single tank.

Your LIGHTNIN Mixer representative can tell you how much *you'll* save with LIGHTNINs in your crude storage tanks. Look him up in Composite Catalog and call him in. Or write us direct.

*Based on field studies by a major pipe line company. Details on request.

Lightnin® Mixers

MIXCO fluid mixing specialists

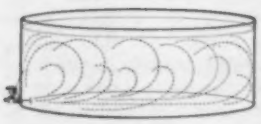


Get these helpful bulletins on BS & W control and LIGHTNIN Mixers. Check, tear out and mail to us today with your name and company address. Free—no obligation.

- ☐ B-503 BS & W Control with LIGHTNIN Mixers
- ☐ B-104 Side entering mixers, 1 to 25 HP
- ☐ B-107 Data sheet for figuring mixer requirements
- ☐ B-109 Condensed catalog describing LIGHTNIN Mixers —all types
- ☐ B-111 LIGHTNIN rotary mechanical seals for extra-low-cost mixing

MIXING EQUIPMENT Co., Inc., 174-n Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 10, Ont.



YOU CAN MAINTAIN bottom sediment level of as little as one inch, year after year, with LIGHTNIN Mixers in your tanks.

Basic elements of LPG liquid metering systems are shown in proper position, and a drawing of a typical vapor-manifold arrangement for an LPG system is included. Four schematic drawings show how various types of liquid LPG meters can be installed with restricted vapor-flow connectors, strainers, and check, stop, bypass, differential, and excess-flow valves. **Write or call: Meter and Valve Div., Rockwell Manufacturing Co., 400 North Lexington Avenue, Pittsburgh 8, for Bulletin OG-412.**

●

Piping System Installations — where corrosion resistance or weight are factors—are outlined in a new 30-page catalog on polyvinyl chloride (PVC) pipe. The catalog contains specific data on PVC's general characteristics, properties, applications, and installation techniques. An eight-page chart classifies the corrosion-resistance ratings of Types I and II PVC, low-carbon steel, three classes of stainless-steel, cast iron, aluminum, copper, red brass, lead, Monel, and Inconel with 383 chemicals.

The mechanical, thermal, and electric properties of PVC pipe including ASTM test numbers are included for basic reference. Other tables show wall thicknesses, weights, burst pressure, and recommended working pressure on both types of PVC from ¼ to 6-in. diameter. Additional charts show working pressure versus temperature on plain and threaded pipe. Two more charts interpret head loss versus flow rate while a final graph shows friction factors. **Write or call: A. M. Byers Co., Clark Building, Pittsburgh, for PVC pipe catalog.**

●

Double-Reduction Speed Reducers in ratios ranging from 75:1 to 4900:1 are covered in new 20-page Catalog CD-230. The reducers are available in worm-over, worm-under, or gear-shaft vertical models to provide almost unlimited application, according to the maker. Output torque ratings range up to 618,000 lb.-in.

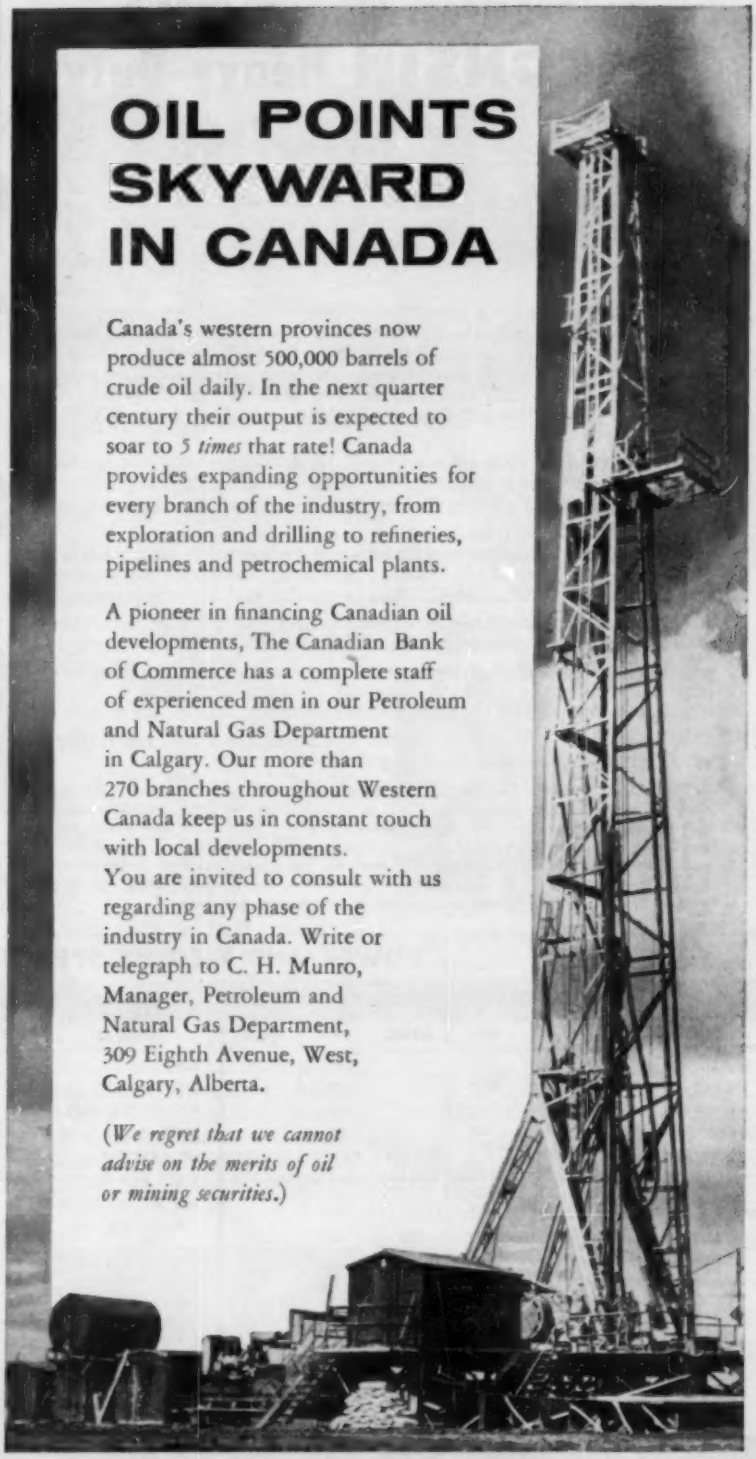
A specifications arrangement makes it a simple matter to pick out a reducer of the exact capacity, type, and ratio desired to fit almost any given job. The double-reduction reducers are made up of standard single-reduction units. They feature double-enveloping worm gearing, oversize, taper-roller bearings, and rugged, ribbed housing for strength and high load-carrying capacity on small center distances. **Write or call: Cone Drive Gears Div., Michigan Tool Co., 7171 East McNichols Road, Detroit 42, for Catalog CD-230.**

OIL POINTS SKYWARD IN CANADA

Canada's western provinces now produce almost 500,000 barrels of crude oil daily. In the next quarter century their output is expected to soar to *5 times* that rate! Canada provides expanding opportunities for every branch of the industry, from exploration and drilling to refineries, pipelines and petrochemical plants.

A pioneer in financing Canadian oil developments, The Canadian Bank of Commerce has a complete staff of experienced men in our Petroleum and Natural Gas Department in Calgary. Our more than 270 branches throughout Western Canada keep us in constant touch with local developments. You are invited to consult with us regarding any phase of the industry in Canada. Write or telegraph to C. H. Munro, Manager, Petroleum and Natural Gas Department, 309 Eighth Avenue, West, Calgary, Alberta.

(*We regret that we cannot advise on the merits of oil or mining securities.*)



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You get **MORE ENGINE**
for your money when you specify...

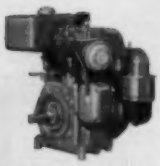
WISCONSIN Heavy-Duty *Air-Cooled* ENGINES

Supplied in a highly selective range of sizes from 3 to 56 hp., in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models, the Wisconsin line offers the power user the *right engine* to fit the job and the machine, without power waste and with the greatest power advantage.

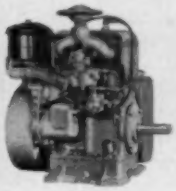
- All Wisconsin Engines are of heavy-duty design and construction . . . to provide the inbuilt stamina, long-life endurance and low-cost maintenance so essential to heavy-duty service applications. Every Wisconsin engine is equipped with such extra-value features as tapered roller main bearings at *both* ends of the drop-forged crankshaft. Even the smallest models are supplied with FOUR piston rings.
- All Wisconsin Engines are of basic High Torque design to provide maximum *usable power* . . . the *Load-Holding Lugging Power* that *hangs on* and *carries on* under severe shock-load operating conditions.
- All Wisconsin Engines can be adapted to operation on a variety of most readily available fuels . . . gasoline, kerosene, LP fuels, natural gas or fuel oil of 38-42° Baume gravity and 35 Octane rating.
- All Wisconsin Engines are AIR-COOLED for efficient, trouble-free operation at temperatures from low sub-zero to 140°F. (60°C.).
- All Wisconsin Engines are backed by a world-wide service organization. More than 2,000 Authorized Wisconsin Engine Service Stations carry a stock of factory-recommended parts for *all models*.

The power user gets "more engine" per horsepower and per dollar invested in dependable driving power.

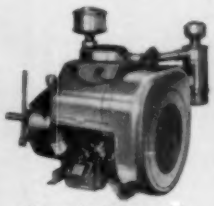
SPECIAL EQUIPMENT — All models can be supplied with variable speed controls, clutch take-off assembly, electric starter and generator (or starter only), Stellite exhaust valves and valve seat inserts (regularly supplied on Models THD, VG4D and VR4D) and positive type Valve Rotators. Clutch reduction assemblies available on all models except VG4D and VR4D. Rotating screen available for all models. High Temperature Automatic Safety Switch also available on all models except small single cylinder models. Special equipment must be specified at time engines are built.



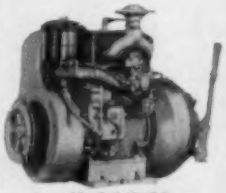
4-cycle Single Cylinder models, 3 to 12½ hp.



2-cylinder models, 10 to 18 hp.



V-type 4-cylinder models 15 to 56 hp.



Model THPD Oil Well Pumping Engine

Get the details about the new Wisconsin Oil Well Pumping Engine with Built-in High Momentum Factor.

• Large capacity cooling fan is integrally cast with the flywheel and provides correct heat dissipation at all temperatures up to 140° F.

• Self-cleaning, file-hard tapered roller bearings at BOTH ends of the crankshaft take up end-thrust and radial loads.

• Highly dependable weather-sealed high tension magneto with impulse coupling, outside mounted for easy accessibility, delivers fast starts at all times.

• Positive lubrication supplied by a pump-circulated splash system for smaller models. Geared lubrication pump on larger models delivers individual oil stream to each rod.

POWER AND WEIGHT SPECIFICATIONS

Single Cylinder Models					
MODEL	ACN	BKN	AENL	AEH	AGN
BORE	2⅛"	2⅛"	3"	3"	3½"
STROKE	2¾"	2¾"	3⅛"	3⅛"	4"
NO. OF CYLINDERS	1	1	1	1	1
DISPL. CU. INCHES	14.88	17.8	23	23	38.5
HP. RANGE	2.5—6	3.5—7	4.7—9.2	4.6—7.4	7.7—12.5
SPEED RANGE—RPM	1600-3600	1600-3600	1600-3600	1800-3200	1600-3200
NET WT. IN LBS.					
Engine with Stub Shaft	76	76	110	130	180
Added Wt. for Clutch	26	26	35	35	35
Added Wt. for Reduction	18	18	25	25	60
Added Wt. for Clutch Reduction	—	—	60	60	80

Two and Four Cylinder Models							
MODEL	TH	THD	VE4	VF4	VH4	VG4D	VR4D
BORE	3¼"	3¼"	3"	3¼"	3¼"	3½"	4¼"
STROKE	3¼"	3¼"	3¼"	3¼"	3¼"	4"	4½"
NO. OF CYLINDERS	2	2	4	4	4	4	4
DISPL. CU. INCHES	53.9	53.9	91.9	107.7	107.7	154	255
HP. RANGE	10—16.4	10—18	13—21.5	15—25	14—30	25—37	43—56.5
SPEED RANGE—RPM	1600-2600	1600-3200	1400-2400	1400-2400	1200-2800	1400-2400	1400-2200
NET WT. IN LBS.							
Engine with Stub Shaft	205	205	295	295	310	410	775
Engine with Side Mount Tank	220	220	315	315	330	440	—
Power Unit with Stub Shaft	255	255	355	355	370	495	895
Added Wt. for Clutch	35	35	40	40	40	100	120
Added Wt. for Reduction	60	60	65	65	65	—	—
Added Wt. for Clutch Reduction	85	85	90	90	90	150	220

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

A7-6157-1PC-R

McCullough Tool Co. Makes Personnel Changes . .

in its sales department, according to I. J. McCullough, president.

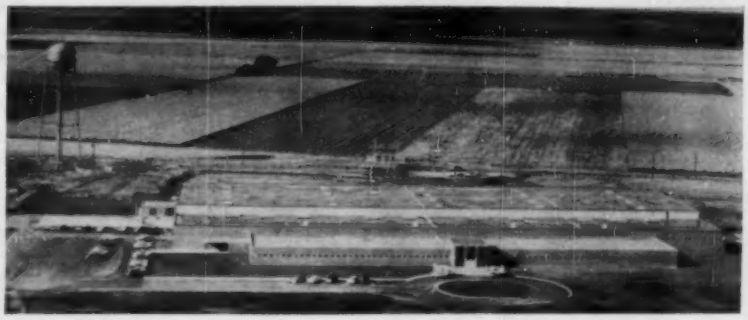
Jim Helmer, formerly in the logging department at the Los Angeles headquarters office, has been appointed sales representative at the Bakersfield, Calif., branch; Olin McGrew, sales representative formerly at the Kimball, Neb., branch, has been transferred to sales duties in the Four Corners district, headquartering at Durango, Colo.; and Jim Dotson, former serviceman at the Kimball branch, has been promoted to sales representative in that area.

Tidelands Exploration Co. Moves to New Quarters . .

on Westheimer Road, Houston. The firm has just moved its offices and operating facilities to the colonial home purchased from Tidelands Employes Trust. The buildings are being converted to crew quarters, equipment repair and testing laboratories.

According to J. B. Ferguson, president, the need for larger, more functional quarters made this move necessary in order to better serve clients in seismic, gravity and magnetic surveys.

In addition to Ferguson, officers of the firm include Ray J. St. Germain, vice president; E. E. Jones, vice president; and R. R. Moore, secretary.



Production Begins at Rockwell's New Valve Plant . .

at Kearney, Neb. The 180,000-sq.-ft. plant is now in limited production, it has been announced by Lloyd A. Dixon, Jr., vice president in charge of the meter and valve division of Rockwell Manufacturing Co. Rockwell-Nordstrom lubricated plug valves will be completely machined, assembled and tested there.

General manager of the plant is Weldon D. Willes, who is also assistant to the president of Rockwell's locomotive finished material division, with plants at Atchison, Kans., and St. Joseph, Mo.

Bovaird Supply Co. Elects Officers and Directors . .

at its annual meeting as well as reviewing 1957 operations and giving an optimistic outlook for 1958.

Officers reelected for the year were Davis D. Bovaird, president; Roscoe G. Ayers, vice president and general manager; Raymond E. Batchelor, vice president and sales manager; T. H. Trower, secretary-treasurer; M. B. Park, assistant secretary-treasurer; and W. J. Bovaird, general manager of stores.

All the officers and R. M. McMahan, Bradford J. Williams and A. E. Booth of Bradford, Pa., were reelected as directors; Trower was also elected to the board.

During the last few weeks the company established two stores, one in Shreveport, La., and the other at Farmington, N. M. This makes a total of 28 stores and offices in Oklahoma, Illinois, Kansas, Louisiana, Texas and New Mexico. The firm is beginning its eighty-seventh year of serving the oil industry.

Seated is Davis D. Bovaird, president. Left to right: R. M. McMahan, T. H. Trower, Raymond E. Batchelor, A. E. Booth, Rosecoe G. Ayers, W. J. Bovaird and Bradford J. Williams.

W. B. Campbell Appointed By F. H. Maloney Co. . .

as advertising manager. Maloney is a specialized manufacturing company dealing in rubber, metals and plastics for the oil, gas and allied industries. Headquarters office and plant are in Houston. Campbell previously was with Graybar Electric Co., the Houston Chronicle and after that headed his own company, Camera-Graphics Co.

Flori-Houston Appoints Kenneth E. Martin . .

to head the new western district sales office. His headquarters as district sales manager is part of the new national sales team inaugurated by Flori Pipe Co. and Houston Pipe Steel, Inc., subsidiaries of Sparton Corp.

Martin will serve the states of Washington, Oregon, California, Nevada, Utah and Arizona from headquarters in Los Angeles. He joined Houston Pipe & Steel, Inc., in 1953, and served in both the engineering and sales departments.

Mountain Fuel Supply Co. Names H. M. McCamish . .

manager of the pipeline division with headquarters at Rock Springs, Wyo., where he will work under J. T. Simon, vice president.

McCamish formerly was with Coast

Counties Gas & Electric Co. in California and has recently returned from Pakistan where he was chief engineer (development) for the Sui Gas Co.

Universal Appoints L. F. Burleson . .

sales representative on industrial accounts for the Houston firm.

Burleson's experience with Universal Packing & Gasket Co. has included virtually every phase of the business. The company expects his addition to the sales staff for Houston and the surrounding area to improve the firm's services to Gulf Coast industry.

Hercules Motors Expands Houston Branch . .

to increase and improve service to engine users in the petroleum, construction, industrial and marine industries in the Texas area.

Moving its Houston factory branch to larger quarters has provided Hercules Motors Corp. with one-third more space, including an enlarged showroom and parts department, an expanded repair shop and new offices. The enlarged facilities make possible larger stocks of Hercules gasoline, gas and diesel engines and power units, larger stocks of parts and expanded engine-rebuilding and repair.

At Houston, James A. Embry is regional manager and David A. Otto branch manager.

Maintenance Engineering Corp. Appoints Two . .

to sales posts for this Houston manufacturer of refinery, pipeline, steam and chemical-plant control equipment.

Kenneth O. Davis will serve as sales-service engineer in the chemical division of Meco, and Robert L. Durall as a sales engineer on Hagan controls distributed by Meco.

Davis joined the firm in September 1957. Prior to that he served with a major refining company as water chemist. Before joining Meco, Durall was service engineer for a meter company.

Spartan Named Distributor For Collins Radio Co. . .

covering the states of Oklahoma, New Mexico, Arkansas, Georgia, Alabama, Mississippi, and the Texas Panhandle.

The announcement was made in Tulsa coincident to the signing of contracts by Capt. Maxwell W. Balfour, vice president of Spartan Aircraft Co., and Dan L. Cahill, regional sales engineer for Collins.

Collins manufactures communications equipment and navigation instrumentation. Spartan aviation division has large shop facilities and a full complement of mechanics and technicians in Tulsa for complete one-stop service including repair, overhaul and modification.

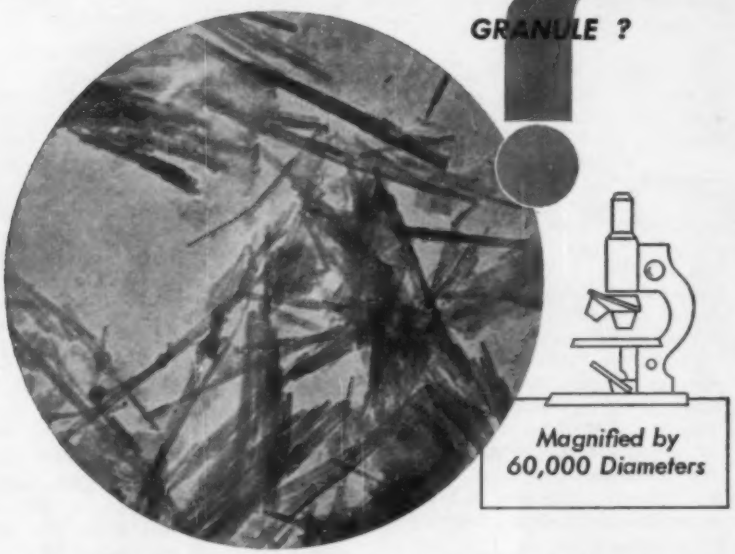
Byron E. Gardner, sales manager for the division, states that plans are being formulated to establish dealers for Collins business aircraft equipment in all the market areas assigned his company.

Byron E. Gardner, seated; Capt. Maxwell W. Balfour; Dan L. Cahill.

EVER LOOK INSIDE A

Florex ?

GRANULE ?



The fibrous nature of Florida Fullers Earth, commercially available as Florex, reveals each unit consisting of about 2200 molecules in a bundle, providing ready selectivity in adsorption of color and contamination from organic and inorganic liquids and gases.

Florex quality means specially processed fullers earth giving maximum surface area and adsorption efficiency. Florex is unequalled in high quality or low cost for processes involving the use of highly active clay for sweetening light distillates, dehydration, desulfurization, and polymerization.

Standard meshes from 2/4 to 200/up and our experienced adsorption specialists are available to help you solve complex laboratory or production problems.

FLORIDIN COMPANY

Adsorbents
Desiccants
Diluents

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Security Engineering Appoints Helies, Sisk . .

J. C. HELIES

as executive vice president and manager of industrial relations, respectively. John C. Helies will cover all Security activities except sales, according to C. L. Lane, president of Security Engineering Division, one of the Dresser Industries. Helies was formerly with Dresser 3 years. Prior to that, he was general manager of a division of General Electric Co.

Henry L. Sisk was also formerly with Dresser, as a staff assistant on industrial relations. Earlier he was a business consultant and for 4 years was supervisor of organizational planning for Continental Can Co.

Western Co.'s Odessa Station Moves . .

to a new location 4 miles west of Odessa on U. S. Highway 80. H. E. Chiles, Jr., president, reports that the station is Western's largest from standpoint of building area, equipment and shops.

The 12,400-sq.-ft. shop building contains a fireproof paint shop for Western's equipment. Offices are in a 2,500-sq.-ft. building separate from the shop.

Western operates eight other district stations in a four-state area, offering logging, perforating, fracturing and acidizing services.

Armstrong Cork Co. Forms Contract Subsidiary . .

J. W. LIDDELL

to be known as Armstrong Contracting & Supply Corp. It will handle all contracting operations now carried on by the insulation division, Company President C. J. Backstrand has announced.

Armstrong will continue its insulation division under General Sales Manager A. E. Pearce, to be responsible, as heretofore, for the outright sales of the company's insulating materials through established distribution channels.

Officers of Armstrong Contracting & Supply are J. W. Liddell, president; E. D. Ainslie, Jr., and A. J. Stream, vice presidents; and E. W. Hines, secretary-treasurer. Serving as directors will be Liddell, current manager of contract operations, and the following officers of the parent company: Backstrand; Kenneth O. Bates, executive vice president; M. J. Warnock, vice president; H. R. Peck, vice president and general manager of building materials operations; W. N. Hartman, assistant treasurer and general manager of new product coordination; and Albert H. Sheaffer, acting secretary and general manager of the general legal department.

Standard Magnesium Corp. Opens Houston Office . .

and appoints Frank Dorr as the firm's chief corrosion engineer, headquartering in the new office.

According to R. M. Wheeler, president, Dorr will be available for free consultant work and design and supervisory work on magnesium anode installations. He will also continue his lecturing activities on corrosion control.

Dorr has been engaged in consultant work for the past 10 years. While operating his own firm, Dorr Engi-

OILCO *Spring-Matics* SIMPLIFY TRANSPORT LOADING

No. 450-AM
3" and 4"

Oilco Spring-Matic No. 450-AM provides all the elements for trouble-free loading, ease of operation, compactness, greater flexibility, less evaporation losses, and minimum cost.

Available in different models and sizes to meet all applications

Representatives in all leading cities, U. S. and Canada

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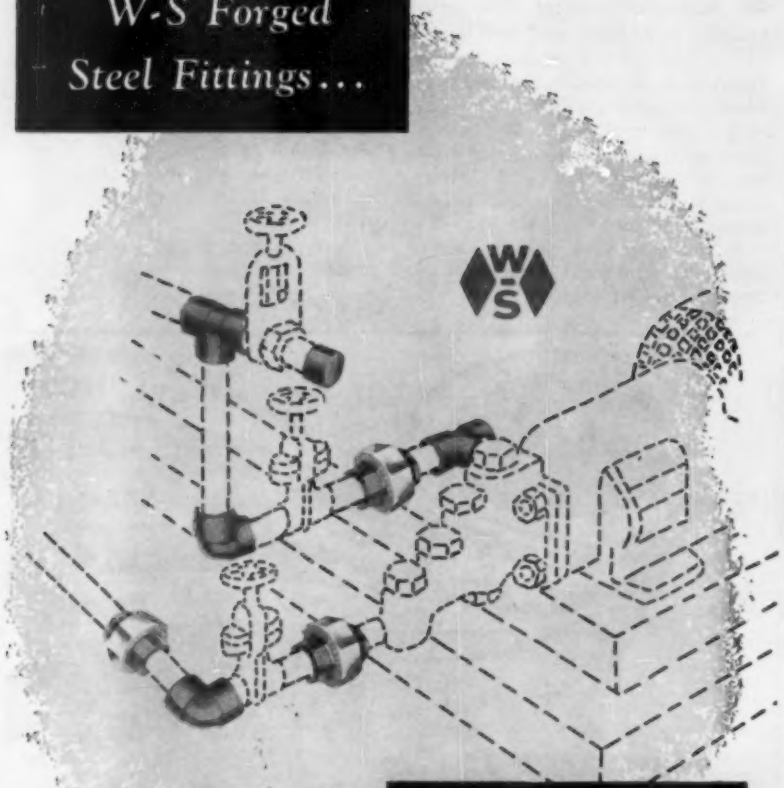
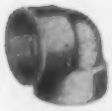
W-S Forged Steel Fittings...



Standouts for Pump and Compressor Piping



Whether the fluid be water, steam, oil, gas or chemical solutions ... if they are being pumped at high pressure, W-S Forged Steel Fittings will protect your pump or compressor piping. They are designed and manufactured to provide maximum resistance to pressure, shock and vibration.

W-S Fittings are drop forged from high strength carbon steel bars and precision machined on modern automatic equipment. A new blue synthetic coating protects the fittings from rust in storage and in service.

Don't forget ... you can order your W-S Fittings in handy packaged quantities.

For detailed information on our complete line of screw-end and socket-welding forged steel fittings, write to W-S Fittings Division, H. K. Porter Company, Inc., P.O. Box 95, Roselle, N. J.

H. K. PORTER COMPANY, INC.

W-S FITTINGS DIVISION

neering, Inc., he designed and supervised the installation of cathodic protection systems in many parts of the world.

Standard Magnesium has general offices and main plant in Tulsa.

Refinery Engineering Co. Realigns Sales Posts . .

by promoting D. F. Ferguson to manager of sales and naming J. Ray Stough assistant manager. Harold F. Koons, formerly chief project engineer, becomes sales development engineer to head a newly created sales-

D. F. FERGUSON

J. RAY STOUGH

engineering group. The cost-estimating department, under Donald B. Crawford, has been shifted to the sales division, and John H. Rodolf switches from estimator to sales representative, according to H. V. Flemming, sales vice president.

Ferguson, who was assistant sales manager previously, has been with Treco 3½ years, serving as chief process engineer before transferring to sales. He previously spent 11½ years with Eastern States Petroleum Corp. Stough joined Treco 2 years ago after extensive experience as a sales representative with petroleum service companies in the United States and Canada.

Pritchard Appoints Canadian Sales Agent . .

for the province of Ontario. MacDonald Process Equipment, Ltd., Toronto, has been named by J. F. Pritchard & Co. of California, a division of J. F. Pritchard & Co., Kansas City, Mo., manufacturer of cooling towers and hydryers.

James A. McDonald has 18 years' experience in the process industries and mechanical construction as a construction engineer, design engineer, material procurement and sales.

Southern Geophysical Co. Plans New Facilities

Dr. Sidon Harris, president, said the new facilities will consist of five buildings on an 8-acre tract. The

OIL MEN CALL US 'BANKERS'. . . but BANKERS CALL US 'OIL MEN'! ! !

You can talk the strange language of Oil with us because we "made up" some of the words! Fifteen of our directors are directly affiliated with the oil industry. We have one of the largest Oil Credit files in the nation; OIL LOAN service that includes oil-wise Trust Dept. counsel. See R. ELMO THOMPSON, R. OTIS McCLINTOCK, RUSSELL F. HUNT, WM. W. MICHAELS, or BILL KENDALL. Remember, in Tulsa . . . in the Middle West . . . it's BOTH pleasant and profitable to . . .

Think 1st

FIRST NATIONAL BANK & TRUST CO. of Tulsa

SINCE 1895

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

NEW KINZBACH SPEEDMILLS

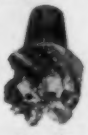
Slash **DOWN-HOLE CUTTING TIME**

UTILIZING TUNGSTEN CARBIDE PARTICLES that continuously renew their cutting edges, new Kinzbach Speedmills offer you faster, surer milling under even rugged down-hole conditions.

Kinzbach Speedmills require less torque for cutting . . . eliminate drill pipe wind-up . . . reduce shock on drilling string . . . are unaffected by heat generated by normal cutting action. The usual close control of speed and weight required in ordinary subsurface cutting operations is not necessary with Kinzbach Speedmills.

Types available for every down-hole milling problem.

Type 154 Speedmill



Type 155 Speedmill

Type 156 Speedmill

Type 159 Speedmill

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Export Office: 74 Trinity Pl. New York, N. Y.

KINZBACH TOOL CO., INC. • P. O. BOX 277 • HOUSTON, TEXAS

New RIDGID

4PJ Geared Threader

*** is now**

JAM-PROOF

***Automatically Stops Threading After Standard Length Thread Is Cut**

Power drive threading is safe and easy with this new 4PJ—no more watching of either die stock or drive! 4PJ can't jam—drive pinion kicks out automatically after full thread is cut. Extra-easy to handle . . . mistake-proof workholder, no bushings . . . fully enclosed gears . . . RIDGID most-for-your-money—Buy new 4PJ at your Supply House!

RIDGID 400A Power Drive with Universal Drive Shaft operates 4PJ Threader on 2½" to 4" pipe held in Tristand Chain Vise, all RIDGID products.

The Ridge Tool Company, Elyria, Ohio, U.S.A.

RIDGID

Work-Saver Pipe Tools

building complex will include an administrative building, mechanical shops, a research building and a plant for manufacture of related electronic products. There will be more than 29,000 sq. ft. of floor space.

The company's present building on Camp Bowie Boulevard will be sold during the period of construction of the new facilities, planned for early 1958. Since the present quarters were built in 1950, exploration activity has increased in Louisiana and Rocky Mountain states until a site near the large airports was an important factor in the decision to relocate.

Solar Aircraft Co. Names H. C. Donahue . .

as applications engineer for gas turbine sales to the oil industry in the Gulf Coast area, according to France Q. Wilson, manager of turbine sales.

Donahue will headquarter in Houston. He has had 17 years' experience in diesel engines, much of it in the gulf area. Prior to joining Solar, Donahue was with Murphy Diesel Co. as district sales representative in the gulf area for 7 years, and prior to that was field engineer for Fairbanks, Morse & Co. in Dallas.

Solar presently is manufacturing 500-hp. Jupiter gas turbines for marine propulsion application. Jupiter engines are expected to boost the top speed of work boats to 40 m.p.h.

Rives, Dyke & Co. Named By Reed Roller Bit . .

as advertising agency for its oil tool division, according to Kenneth M. Rice, Reed advertising manager.

Much of the advertising work to be done for Reed by Rives, Dyke will center around a new three-cone rock bit known as the Y series.

Recent Rives, Dyke expansion has included the addition of marketing research facilities and a complete public relations department to existing facilities.

Nelson Electric Conducts Western Demonstrations . .

of explosionproof electrical equipment to 879 supervisors in major companies.

L. G. Johnson of Nelson Electric Manufacturing Co., Tulsa, conducted 46 demonstrations within a month in Oakland, Los Angeles, Phoenix, and El Paso.

The Tulsa-built equipment is distributed by 50 factory representatives throughout the United States, Puerto Rico and Canada.

Management Organization Broadened by Motorola . .

in its wholly owned sales and service subsidiary, Motorola Communications & Electronics, Inc. Homer L. Marrs has been appointed vice president and operations manager, and Harold A. Jones, former staff director of sales, has been elected to succeed Marrs as

H. L. MARRS

H. A. JONES

vice president and midwestern area sales manager, according to Arthur L. Reese, vice president and general manager.

As part of his new duties, Marrs will manage the nationwide sales-engineering activities of the Motorola Communications product line. He joined Motorola in 1938 and became a regional sales manager in 1945. In

WHEELING
COUPLINGS
FOR OIL COUNTRY USE
LINE PIPE COUPLINGS A.P.I.
⅛" to 12" Seamless
Black or Galvanized
PLAIN TUBING COUPLINGS A.P.I.
1" to 4"—Seamless
EXTERNAL UPSET TUBING COUPLINGS A.P.I.
¾" to 3½"—Seamless
CASING COUPLINGS A.P.I.
4½" to 13⅜"—Seamless Long or Short
HYDRAULIC COUPLINGS
⅛" to 4"—Seamless
REAMED AND DRIFTED A.I.S.I.
¾" to 12"—Seamless
DRIVE PIPE COUPLINGS
6" to 12"—Seamless
Sales Offices in Leading Cities
Albany, N. Y.—Albert L. Becker, 434 Clinton, Ave.
Baltimore, Md.—James W. Frankhanel, 2301 No. Charles St.
Chicago, Ill.—Harry A. Jay, Suite 1090 Old Colony Bldg.
Denver, Colo.—Earl H. Jones & Co., 1863 Wazee St.
Detroit, Mich.—R. W. Lang, Jr., 505 Park Ave.
Erie, Pa.—R. J. Maggi, Box 711
Falmouth, Mass.—Walter S. Bennett, 53 Minot St.
Grand Rapids, Mich.—R. W. Lang, Jr., 138 Burton SE
Houston, Tex.—Henry H. Paris Distributor, Inc., Box 932
Independence, Mo.—Craig A. Fross, 3701 Norwood
Los Angeles, Calif.—James A. Riordan Co., 1400 Santa Fe Ave.
Louisville, Ky.—Sid Schultze Co., 849 So. 6th St.
Milwaukee, Wis.—W. G. Nelson, 3347 N. 97th St.
Norberth, Pa.—J. W. Worthington, 105 Forrest Ave.
Newark, N. J.—Ira L. Rothenberg & Assocs., 398 Market St.
New York, N. Y.—Max Rothenberg, 11-05 38th Ave., Long Island City
Omaha, Nebraska—Wm. Freiden, Central States Engineering & Sales Co., 5101 Blondo St.
Oswego, N. Y.—Northeastern Associates, Inc., Neil Chatterton, Sec'y., P. O. Box 284
Portland, Ore.—Earl H. Jones & Co., 1233 NW 12th Ave.
Richmond, Va.—P. C. Abbott & Co., 15 E. Franklin St.
Seattle, Wash.—Earl H. Jones & Co., 819 Thomas St.
St. Louis, Mo.—Walter C. Dollinger Co., 4869 Goodfellow St.
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Welex, Inc. offers the most complete wire line service available to the oil industry today. Complete perforating services include those which have revolutionized the perforating industry with positive penetration every time. Radioactivity and electric resistivity logs are unexcelled in the field. Other associated useful wire line services which round out the completeness of services by Welex include side wall coring, squeeze cementing, bridge plugs and production packers and complete auxiliary logging services.

For complete wire line service, whenever and wherever it is needed, call your nearest Welex representative.

WELEX, INC.

General Offices: 1400 East Berry, Fort Worth, Texas
Division offices in Dallas, Denver, Houston, Los Angeles, Midland, New Orleans, Tulsa and Wichita.
District offices in every major oil center. Subsidiaries in Canada, Peru and Venezuela.

1955 he was put in charge of the 13-state midwestern area and elected a vice president. Jones, who has been with Motorola 11 years, will now be in charge of the midwestern sales area. He has held positions in development and systems engineering, advertising and sales promotion and sales-engineering management. He has been staff director of sales for the last 2 years.

Marrs will office at executive headquarters in Chicago, while Jones will work from the recently occupied midwestern area sales office building, also in Chicago.

Oilwell Transfers Three In Canadian Area . .

with William A. Slocombe, store manager, moving from Red Deer, Alta., to Calgary, according to W. A. Weir, Canadian area manager of the Oil Well Supply Division of U. S. Steel Corp. William J. Millar and William B. Fisher, field representatives, have moved from Okotoks, Alta., to Calgary.

Slocombe, who joined Oilwell in 1950 at Edmonton, Alta., served successfully at Swift Current, Sask., and Wetaskiwin, Alta., before moving to Red Deer in 1955. Millar was employed in 1956 at Okotoks. Fisher was employed at Edmonton in 1948 and was appointed field representative there in 1949. He was also employed as field representative at Oilwell Stettler, Swift Current, Calgary, and Dawson Creek stores prior to appointment as store manager at Valleyview, Alta., in 1955. He became field representative at Okotoks in 1956.

Baroid Division Appoints Area Superintendent . .

for the Texas Gulf Coast area. He is Wendell H. Russell, who will headquarter at Corpus Christi. His area includes the entire Texas coastal area.

Russell has been with Baroid in the well-logging department 11 years and has served as superintendent in the Midland and Mid-Continent areas before going to the Houston general offices.

Brown Fintube Co. Elects Skiba and Towers . .

at a recent meeting of its board of directors. Edward J. Skiba, vice president, engineering, was elected executive vice president and as a member of the board of directors. He will coordinate the operations of all departments of the company.

Douglas W. Towers, chief thermal engineer, was elected vice president, product engineering.

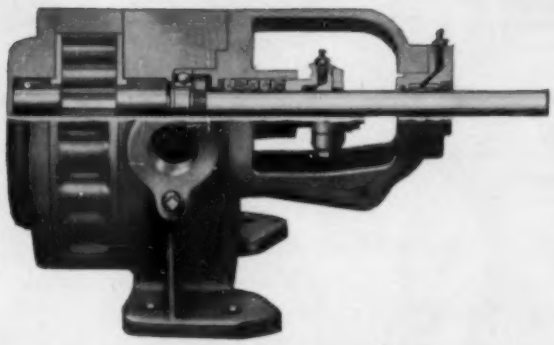
American Cyanamid Co. and Ketjen Form Company . .

to be known as Cyanamid-Ketjen N.V. According to W. G. Malcolm, Cyanamid president, the company has entered into an agreement with Koninklijke Zwavelzuurfabrieken v/h Ketjen N.V. of Amsterdam, Holland, providing for formation of the new company to construct a plant to manufacture initially certain types of platinum reforming catalyst for sale to the oil industry.

Ownership of the new company will be shared equally by Cyanamid and Ketjen company. The plant will be located in Amsterdam on a site adjoining Ketjen's present plant and is expected to be in production before the end of 1958.

The Ketjen company manufactures sulfuric acid, certain petroleum cracking catalysts and a variety of other

PERFORMANCE PROVED
THROUGHOUT THE INDUSTRY



ROPER Rotary Pumps

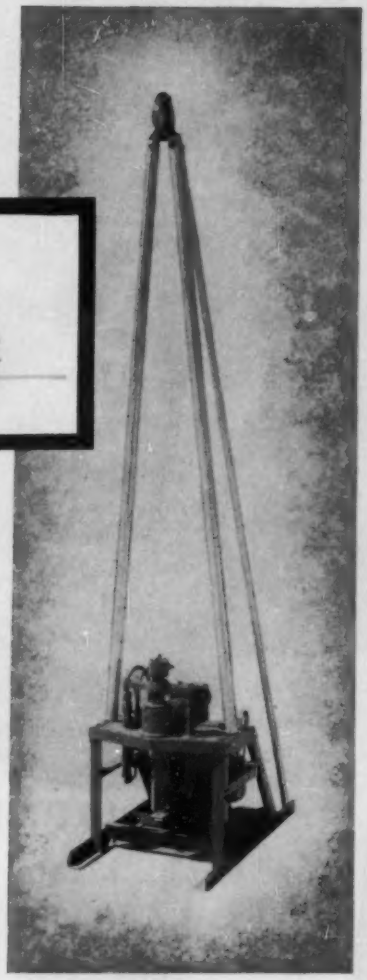
- SERIES H... High pressure pump for gathering line service. Sizes 10 to 75 GPM . . . pressures to 600 PSI.
- SERIES F... Medium pressure pump for gathering lines or field storage applications. Sizes 1 to 300 GPM . . . pressures to 300 PSI.
- SERIES 3600... For field storage transfer or truck transport. Sizes 40 to 300 GPM . . . pressures to 100 PSI.

ROPER HYDRAULICS, INC.
formerly
Geo. D. Roper Corp., Pump Division
112 Blackhawk Park Avenue
Rockford, Illinois

ROPER Rotary Pumps

Get on location—and drill the hole you need

with a *Petty* *Portable Drill*



Are your operations hampered by the combined obstacles of difficult terrain and tough drilling? You can overcome such obstacles with the experience-proven Petty Portable Drill. WHY? . . . because here is an efficient and easy-to-assemble drill of just five basic parts (total weight only 471 pounds, including engine). This unit, plus mud pump and drill rod, gives flexible and dependable drilling service wherever your crews must go.

PORTABILITY — to get on location;
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These are the qualities which have made the Petty Portable Drill world famous with oil companies and contractors alike. You'll find you're time, money and footage ahead when Petty's Portable Drill goes into action for you.

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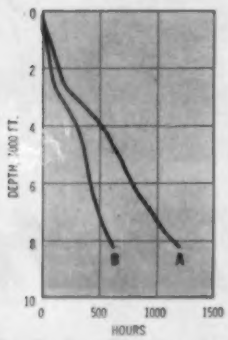
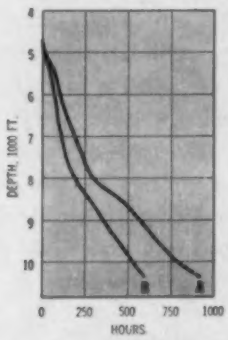
RESULTS LIKE THESE IN OVER 750 WELLS PROVE PERFORMANCE

(Legend: A—drilled with mud B—drilled with O/W)



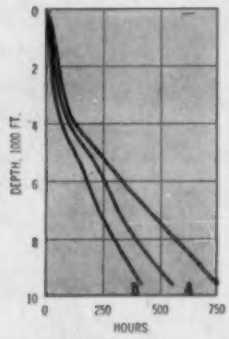
• SAVES 382 HOURS OF DRILLING

On an offset well in Eddy County, New Mexico, operator saved a week of day rate. Penetration rate was doubled with oil-in-water emulsion. Contractor saved ⅗ of bit cost, two weeks' wear on rig.



• COMPLETED TWO WEEKS SOONER

In Gaines County, Texas, well drilled with oil-in-water emulsion was completed in 606 hours . . . compared with 904 for an offset well of comparable depth. Cost per foot was $3.50 lower.



• 30% LESS DRILLING TIME

Comparative results in Hockley County, Texas: 9600-foot wells. Oil-in-water emulsion cut drilling time 245 hours, reduced number of bits by 25% . . . gauge hole required less cement.

Get faster, better completions by drilling with low-solids fluid

New wells completed up to 44% faster . . . when drilled with low-solids, oil-in-water emulsion fluid. TRIMULSO* emulsified drilling fluids are cutting weeks off drilling time . . . the proved way to get new wells drilled and on production with minimum hole trouble and in less time than ever before. Use TRIMULSO and get lower drilling costs per foot.

Better completions: This oil-emulsion drilling fluid has less tendency to block producing sands.

Fast penetration: Less time from spud-in to completion.

True gauge hole: Less cement is needed.

Larger cuttings: For better geological analysis.

Saves time and reduces drilling costs: by increasing bit life . . . reducing wear on rigs . . . allowing higher weight on bits . . . preventing corrosion of drill stem . . . reducing lost circulation. This light weight mud is easy to control. Cuttings settle out quickly in pits.

Use TRIMULSO for your next drilling job. Get full data from your Baroid service engineer today.

LOOK FOR THE AQUANESS SEAL

. . . it identifies the *original* low-solids high-speed drilling fluid emulsifier, made by Aquaness to highest quality standards.

ATLAS

Aquaness Department

ATLAS POWDER COMPANY

2003 Quitman Street, Houston 26, Texas

chemicals. Observing its fiftieth anniversary this year, Cyanamid is a major chemical company with 11 operating divisions and more than 40 plants and laboratories here and abroad.

Tretolite Co. Adds O'Connor and Ganey . .

to its staff. James P. O'Connor, former engineer for The Texas Co., has joined Tretolite as a corrosion engineer at New Orleans, La., succeeding Jim Kepley.

Ellis Lee Ganey, Jr., formerly with La Salle Pump & Supply, has joined Tretolite at Jena, La., as field engineer, replacing Bill Zoller who recently resigned.

Prior to joining Tretolite, O'Connor was concerned with water-flood operations while assigned to The Texas Co.'s Naval Reserve Unit at Nowata, Okla.

J. P. Fouche Rejoins Totco Sales Staff . .

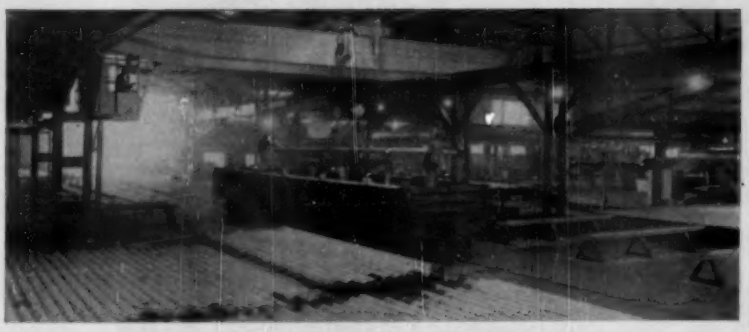
in the Abilene-Sweetwater area. For the past 2 years Fouche has been in the pipe business. For 5 years prior to that he was with Technical Oil Tool Corp., it has been announced by H. H. (Pete) Peters, president.

In his new sales-service assignment, Fouche will headquarter at Abilene and will operate under the direction of Hugh Weathersby, West Texas division manager.

Christensen Starts Plant At Celle, Germany . .

to manufacture diamond bits and associated equipment for the mining and petroleum industries. George Christensen, vice president of Christensen Diamond Products Co., is shown laying a brick of this fourth foreign bit-manufacturing plant established by the firm since 1953. Other affiliated plants are at Paris, Tokyo and North Bay, Ont., Canada.

This new German company will be known as Christensen Diamond Products Co. G.M.B.H.



Pipe Line Service Corp. Has New Maryland Plant . .

at Sparrows Point which has six fully equipped production lines for coating and wrapping pipe ranging in diameter from ¾ to 30 in. Here all operations, from bare pipe to loading the electrically inspected coated pipe on specially prepared rail cars, are completely under cover.

Located on a 27-acre tract, storage space is available to customers who may purchase pipe, store it, and release for protection and shipment as required.

A. F. Uhrlandt Named to New Crouse-Hinds Post . .

A. F. UHRLANDT

in the Syracuse home offices. As director of field sales, he will direct and coordinate all the activities of Crouse-Hinds Co.'s 11 field sales divisions. He will report to E. R. Monesmith, vice president of sales. According to John R. Tuttle, president and chairman of the board, Uhrlandt has a background of 27 years' experience in the electrical field. Prior to joining the Chicago division in 1943, he was with Westinghouse Electric Corp., Westinghouse Electric Supply Co. and Niagara Mohawk Power Corp. In 1951 he was named manager of the Crouse-Hinds Buffalo region and the following year was transferred to New York City as manager of the company's Northeast division, the position he held until his recent appointment.

Drilco Oil Tools, Inc. Buys Reed Reamer . .

in the Permian basin area, including all bodies and cutters. Drilco will sell and service the West Texas-New Mexico area with reamers for all hole sizes.

The Reed reamer is an outstanding tool in its field because of precision machining and heat-treating of cutters and pins. The cutters will be made by Reed Roller Bit Co. until Drilco has equipped its shops with machining and heat-treating facilities. All new bodies will be manufactured by Drilco.

L. B. Foster Co. Moves Los Angeles Office . .

to the new Tishman Building. The move was made to secure larger quarters for the sales staff, which has doubled since the office was opened in 1953.

L. B. Foster has other offices and warehouses in Pittsburgh, New York, Chicago, Houston and Atlanta.

Mueller Official Elected To NAM Board of Directors

W. H. HIPSHER

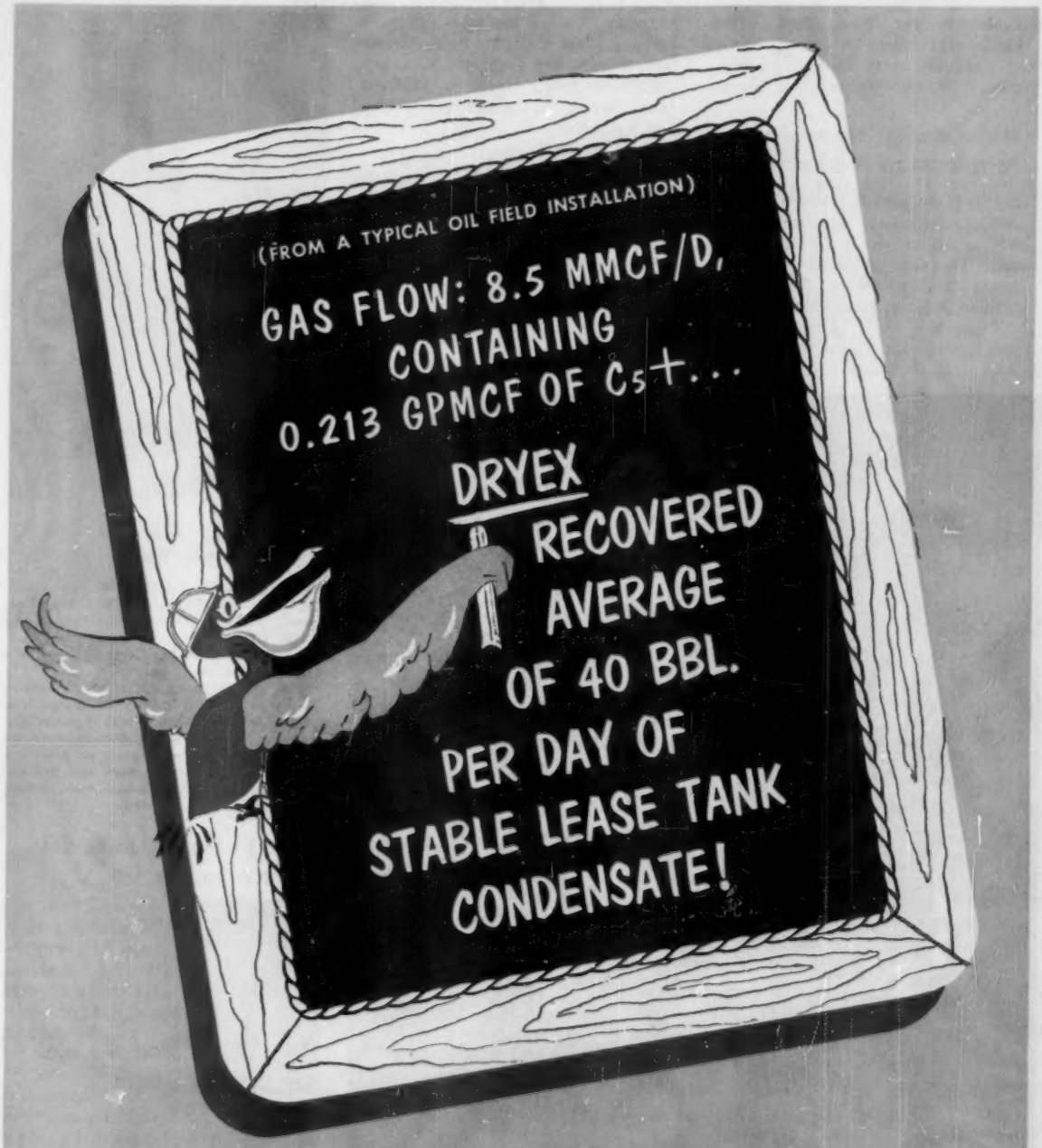
The election of W. H. Hipsher was held during the recent annual meeting of National Association of Manufacturers. Also elected to the board were: Charles S. Craigmile, president, Belden Manufacturing Co.; and F. F. Elliott, chairman of the board of Crane Co.

Hipsher is executive vice president of Mueller Co., having joined the company in 1945 as property manager. In 1950 he was elected financial vice president of the firm and assumed his present position in 1951. He is also a member of the board of directors of Mueller Co. and Mueller, Ltd., Sarnia, Ont., Canada.

Penn Controls Transfers Robert D. Eichman . .

to the Milwaukee district office as a sales engineer where he will assist H. D. Gray, manager.

Eichman joined Penn Controls, Inc. in 1951 and was previously as-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Gordon Smith & Co., Inc., Names H. E. Caraway . .

district sales manager for Louisiana, Mississippi, Arkansas, Oklahoma, and the eastern half of Texas.

The Smith company, Bowling Green, Ky., manufactures Smith air compressors.

Macco Corp. Raised This 212-Ft.-High Tower . .

into position in one piece at the El Segundo, Calif., refinery of Standard Oil Co. of California, Western Operations, Inc. The lift by Pacific crane and rigging division of Macco was one of the heaviest ever accomplished with a load of this type.

The 350-ton fractionation tower, equivalent in height to a 20-story skyscraper, was erected on its foundation with 4 hours' lifting time. The 90-tray deisobutanizer column is an integral part of a plant to process a butane and lighter feed stock and produce components used in the manufacture of high octane and aviation gasoline.

D. C. Kirberger Joins Oil Capitol Supply Co. . .

D. C. KIRBERGER

as special sales representative, according to Tom N. Ward, president. Kirberger previously served with Douglas Aircraft Co. and with National Gypsum.

Oil Capitol Supply, headquartered in Tulsa, was organzied by Ward in 1949.

Grant Oil Tool Co. Acquires Zublin Line . .

of drilling tools. Grant has obtained all patents and manufacturing rights for Zublin differential bits, simplex bits and drain-hole equipment.

The manufacturing of Zublin equipment has been transferred to Grant's new main plant in Los Angeles, according to Grant Vice President A. H. Salvatori, and sales and service for the Zublin line have also been brought into the expanded Grant-MacClatchie sales organization.

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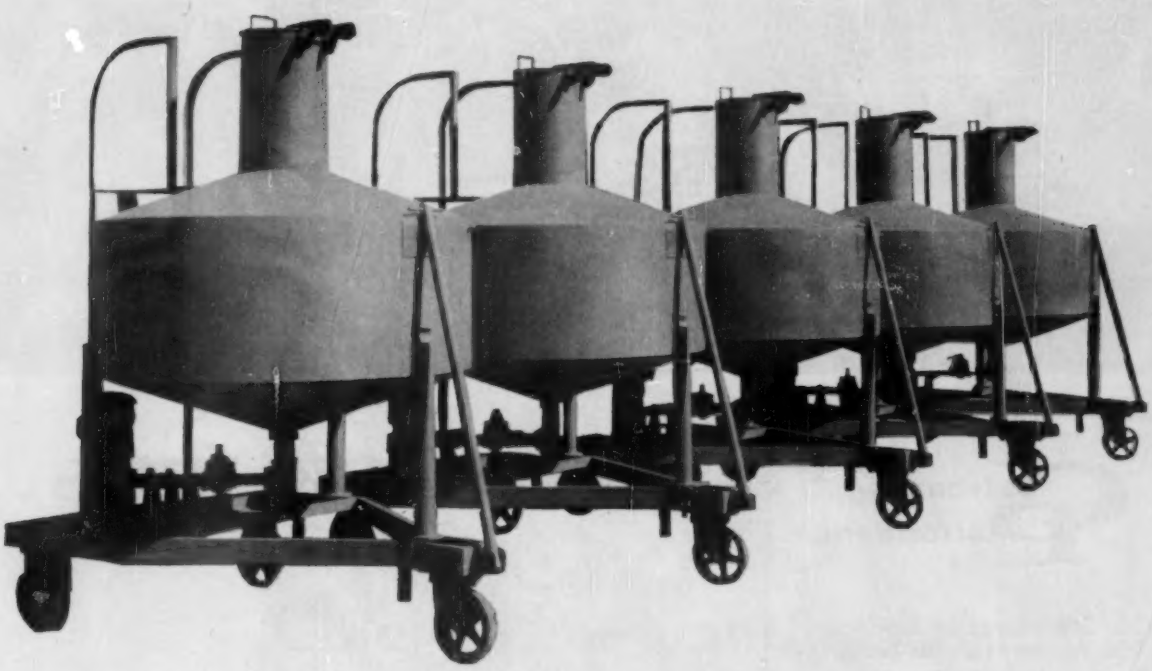

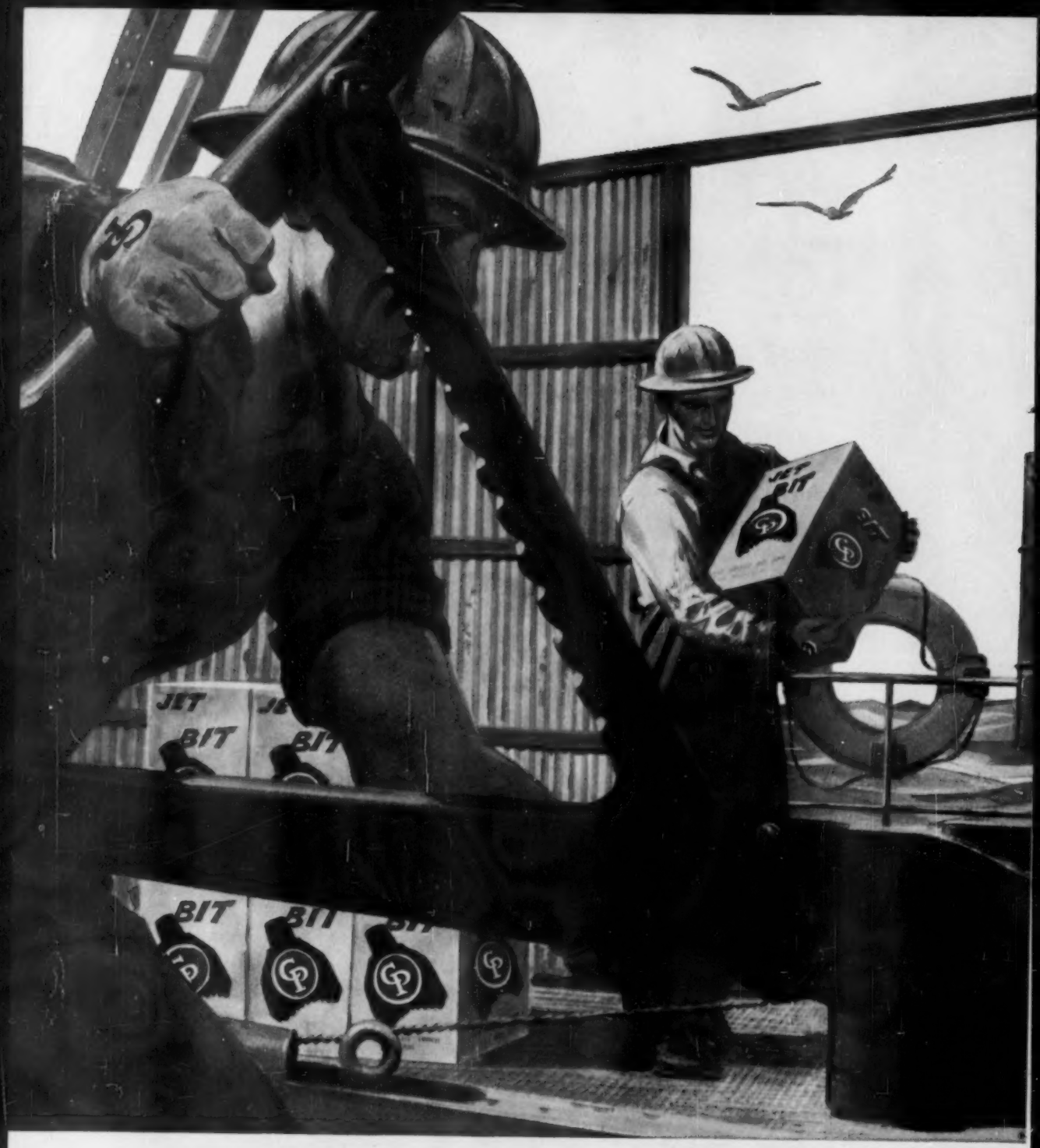

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Desert Sands Could Spring Surprises

. . . from any one of four wildcats

By Frank J. Gardner
Exploration Editor

THREE YEARS AGO, the industry was surprised by the discovery of oil in Nevada. It was the first, and to date the only production in the vast Basin and Range province of Nevada, Utah, Arizona, and southeastern California. Westerners have been disappointed with subsequent discovery attempts; but the initial shock that followed the strike sent droves of geologists, landmen, and scouts to Nevada. That shock should not be forgotten. For it is exactly the type of prodding that our domestic exploration crews need today.

The greatest obstacle in the path of oil discovery in this country today is lethargy . . . lethargy and prejudice. Mix lethargy with ignorance, spice it with prejudice, and you have the recipe for total neglect of vast areas that, for all we know, may hide billions of barrels of undiscovered oil.

Better thinking . . . We've had a couple of shocks this year. And the reaction of the industry was typical of those in the past. The discovery of oil in Washington set off a tidal wave of interest in the Pacific Northwest. The strike in Alaska has repeated the pattern there. And if oil were found in the Mojave Desert, it's a safe bet that 99 per cent of the geologists in this country would be caught completely off guard and unprepared . . . simply because they are not thinking, or are too restricted in their thinking, or are not **allowed** to think.

And it might well happen in the Mojave Desert. Many a broad discovery thinker includes it in his list of prospects. But we know almost nothing about it. This was brought home pointedly last week when four daring wildcats were announced simultaneously, all of them in the Mojave region of southeastern California. Search the literature if you will, and you'll find only scraps of information on Mojave subsurface, and almost as little on surface conditions. Yet, it sits there as a sandy challenge.

And wilder wildcats . . . Take a look at these four desert wildcats:

The nearest to present production is that of C. E. Brown Gas & Oil Co., Los Angeles County; spotted in Section 5-7n-11w, it lies 5 miles east of Lancaster and 50 miles east of the Los Angeles Basin fields. The well has been drilling since October 1956 toward a 2,200-ft. objective.

All the other wildcats lie 150 miles or more away from established oil or gas production. Two are located in San Bernardino County in the middle of the desert: Joshua Hills Oil & Petroleum Co. is spudding in at a location in Section 16-32s-44e, 21 miles northwest of Barstow, while the wildest of the four has been staked in Section 18-10n-21e, 14 miles northwest of Needles, by Flamingo Oil Co., with L. H. Scott as contractor.

Perhaps the best located with respect to known geology is Kent Imperial Corp. 1 Sinclair, in Imperial County. just southeast of Salton Sea. Previous drilling in the area has found carbon dioxide gas, and many anticlines, faults, and other oil-type traps have been mapped in this, the Imperial Valley province. The Kent well, just outside of Calipatria, Calif., is a redrilling operation; after having gone to 4,550 ft., operators plugged it back to 800 ft., sidetracked, and are drilling ahead, objective unknown.

Demolish a rut . . . This quartet of wildcats may seem strange to you. But to the operators who are drilling them, they are not strange at all. What prompted the spudding on each one? A different answer, probably, would come from each of the four operators. But at least, here are four men who are out of the rut in their discovery thinking.

FOUR REMOTE WILDCATS are biting through the sands of California's Mojave Desert and Imperial Valley, 50 to 150 miles from the nearest oil or gas field. Some discovery thinkers contend that both regions are potential oil country.

The November Exploration Summary
British Columbia's Newest Oil Find Is East Akes
Lambert Creek—New Pay Discovery for Foothills and Canada's Deepest Hole
First Oil Production At Table Rock
Hatch Unit Discovery Finaled North of Aneth
Union Bags Third Mountain View Discovery in California
Important Vedder Discovery at North Tejon
Pennsylvanian Production Moved 7 Miles West in Central Hockley County
Pennsylvanian Reef Discovery in Howard County
IMPORTANT HAPPENINGS SHAPING UP IN VIRGINIA HILLS REGION
First Ordovician Oil in Western Canada Hinted
BURKE COUNTY ONCE AGAIN LEADS EXPLORATORY INTEREST
First Pre-Madison Well at Beaver Lodge
Rank Wind River Basin Discovery Completed
New Gas Strike In Near-Dormant Dalhart Basin
Eucutta Joins List of Lower Cretaceous Fields
New Producing-Depth Record on Texas Gulf Coast
Duval County Leads South Texas Drilling Activity

Four new fields added as

North Dakota Leads the Nation

By John C. McCaslin
District Editor

FOR THE SECOND month in a row Burke County, North Dakota's newest oil giant, captured the exploratory lead in the United States. Following close behind were important developments in the Virginia Hills region of Alberta, in the Alberta Foothills, British Columbia, Wyoming, Paradox basin, California, Texas, and Mississippi.

Williston Basin

The growing list of new oil fields in the Lignite area of Burke County in North Dakota's Williston basin added four during November to keep this portion of the basin in the forefront of exploratory interest.

Northwest Oil Drilling Co. and Central LeDuc 1 Klitzke, 4 miles north of Lignite field (nucleus of the busy drilling program in progress in Burke County), is a new Midale-Mississippian discovery for the area.

The Klitzke is 5 miles west of another discovery at Central Le Duc 1 Bird, also producing from the Midale. About 3½ miles southeast of production in Lignite field, Petroleum Corp. of America and Tom Jordan, Jr. 1 Jorgens made 250 bbl. of oil per day on pump from the Midale and the Nesson-Mississippian. The most prolific of the new strikes in Burke County appears to be Arrowhead Exploration Co.'s 1 Probst, 7 miles northwest of Lignite field. This one flowed 56 bbl. of oil per day.

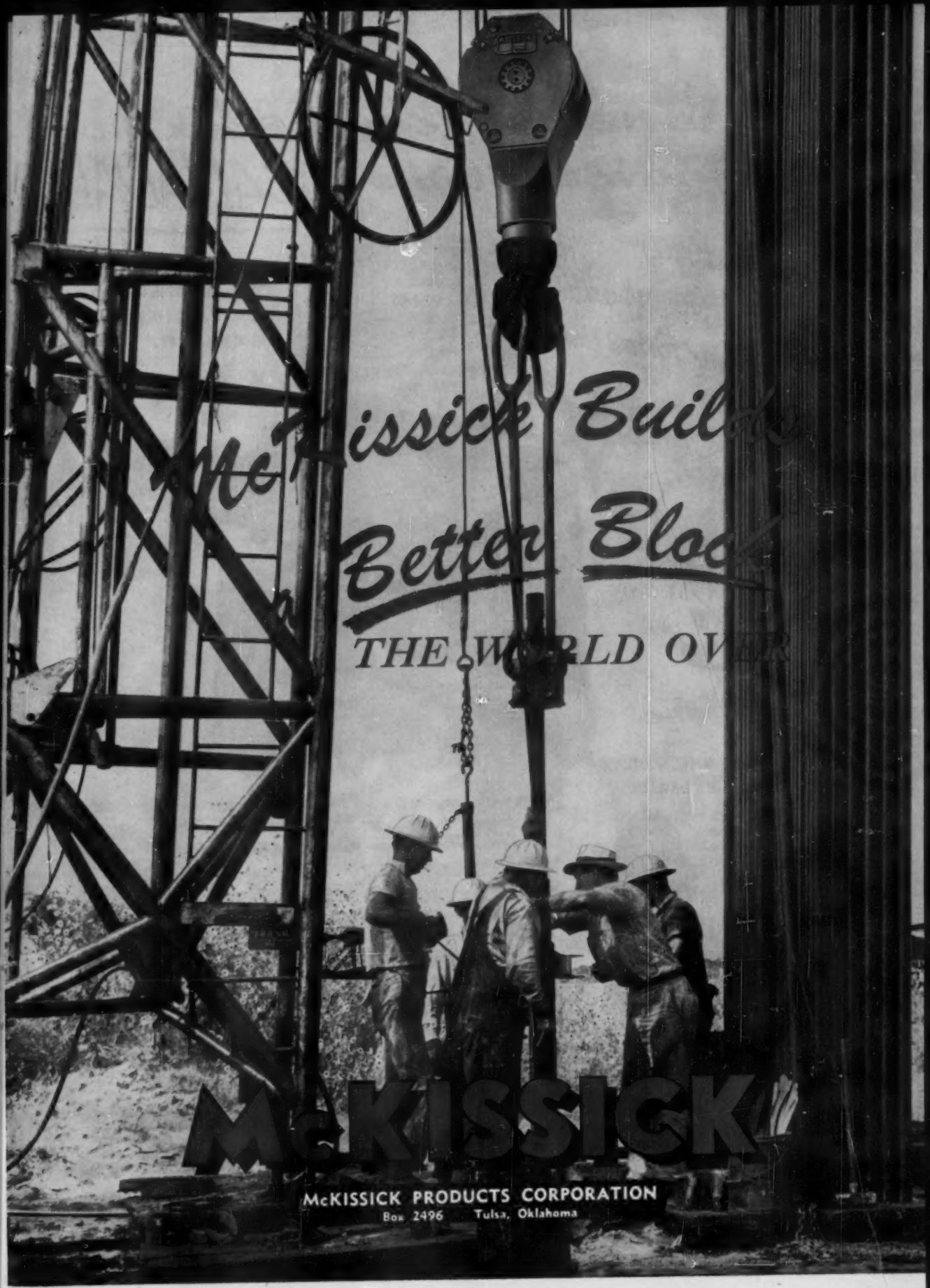
Burke County's climb to first place in Williston basin interest in the past few months is one of the year's exploratory highlights. Indications are that this area will receive even greater drilling attention in 1958. The long-awaited Mississippian success in this section of the basin is here. A few more months of intensive drilling in Burke County may reveal whether or not this area will become another Southeast Saskatchewan.

First deep production . . . Amerada Petroleum Corp. added another chapter to the growing pre-Mississippian drilling in Williston. The 1 Boe Olson Unit, a deep wildcat at Beaver Lodge field, was completed for 351 bbl. of oil from the Devonian and 360 bbl. of condensate per day from the Silurian to open first such production in this field. The original discovery at Beaver Lodge 7 years ago had good recoveries from these zones, but the Boe Olson well is the first to be actually completed from these zones. This new completion is an important wildcat happening for Williston in view of the successful development of pre-Mississippian zones at Outlook in northeastern Montana.

Western Canada

First oil recovery from Ordovician rocks in western Canada was one of the month's most significant developments. Northeast of Montana's Outlook area, Imperial Oil, Ltd., found some oil in the Ordovician at its Hummingbird wildcat. At month's end the wildcat was still testing. If success comes to Hummingbird, it would be the first such production in western Canada and would boom the growing search for pre-Mississippian oil in Williston.

Final completion at Edith Lake plus the announcement of follow-up wells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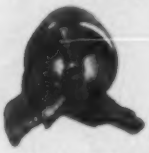

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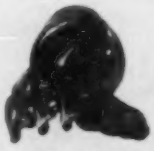
For Soft Formations



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Total November Completions, Exploration and Development

	Total completions							Wildcat wells							Act.
	Total	Crude	Cond.	Gas	Dry	Service	Footage	Total	Crude	Cond.	Gas	Dry	Footage	C.T.	op.
Alabama	3	1	0	0	2	0	28,831	2	0	0	0	2	17,375	0	13
Arizona	3	0	0	3	0	0	3,048	3	0	0	3	0	3,048	0	3
Arkansas	80	45	0	4	31	0	257,619	18	1	0	1	16	59,852	0	100
California	197	136	0	6	52	3	842,078	41	7	0	1	33	236,963	0	209
Colorado	64	16	0	11	37	0	351,458	36	5	0	1	30	208,287	0	125
Illinois	215	79	0	2	134	0	480,338	52	4	0	0	48	106,376	39	421
Indiana	68	34	0	0	34	0	129,303	9	2	0	0	7	14,810	21	100
Kansas	320	156	0	21	137	6	1,174,175	52	9	0	1	42	202,179	11	459
Kentucky	138	39	0	19	80	0	207,825	36	1	0	0	35	44,679	101	180
Louisiana	302	136	25	20	121	0	2,239,271	49	5	4	1	39	422,193	0	487
North	136	73	0	10	53	0	464,045	25	4	0	0	21	148,407	0	163
South	132	47	25	6	54	0	1,443,967	19	1	4	0	14	222,939	0	251
Offshore	34	16	0	4	14	0	331,259	5	0	0	1	4	50,847	0	73
Michigan	25	9	0	0	16	0	77,271	9	0	0	0	9	25,180	16	114
Mississippi	35	5	3	0	27	0	287,356	20	1	0	0	19	160,581	0	54
Montana	47	17	0	0	30	0	220,353	21	1	0	0	20	109,649	6	75
Nebraska	67	20	0	0	47	0	393,327	35	2	0	0	33	198,207	0	67
Nevada	1	0	0	0	1	0	300	1	0	0	0	1	300	0	2
New Mexico	158	99	2	33	24	0	759,029	10	2	0	0	8	40,110	9	283
Northwest	68	25	0	32	11	0	268,048	4	0	0	0	4	9,474	0	165
Southeast	90	74	2	1	13	0	490,981	6	2	0	0	4	30,636	9	118
New York	40	17	0	2	3	18	53,253	4	0	0	1	3	15,523	40	21
North Dakota	34	23	0	0	11	0	214,025	12	3	0	0	9	60,656	0	61
Ohio	95	51	0	15	26	3	219,634	0	0	0	0	0	0	92	141
Oklahoma	542	275	9	20	210	28	1,783,448	69	9	0	5	55	283,375	109	932
Oregon	1	0	0	0	1	0	9,004	1	0	0	0	1	9,004	0	1
Pennsylvania	42	13	0	15	4	10	146,095	0	0	0	0	0	0	40	77
South Dakota	1	0	0	0	1	0	4,882	1	0	0	0	1	4,887	0	2
Texas	1,459	794	49	65	536	15	6,220,262	308	34	7	5	262	1,466,292	55	1,251
Dist. 1	91	26	0	5	60	0	272,365	38	2	0	2	34	132,185	0	44
Dist. 2	63	11	9	12	31	0	395,882	14	0	1	1	12	92,423	0	43
Dist. 3	99	46	14	3	35	1	658,845	20	4	2	2	12	160,239	0	109
Dist. 4	101	31	14	5	51	0	497,054	27	5	4	0	18	155,174	0	67
East	96	56	5	0	35	0	465,228	22	0	0	0	22	116,156	0	56
Dist. 7-B	221	105	0	3	112	1	648,752	60	3	0	0	57	207,572	26	141
West	429	327	1	8	86	7	2,112,616	62	9	0	0	53	339,631	21	570
Dist. 9	267	146	2	6	107	6	746,239	54	10	0	0	44	175,114	8	97
Dist 10	92	46	4	23	19	0	423,281	11	1	0	0	10	87,798	0	124
Utah	31	16	0	2	13	0	171,929	16	2	0	2	12	85,365	0	115
West Virginia	48	6	0	36	6	0	124,769	1	0	0	1	0	4,914	48	244
Wyoming	76	30	0	5	41	0	359,054	31	4	0	3	24	189,085	4	180
Nov. 1957	4,092	2,017	88	279	1,625	83	16,757,937	837	92	11	25	709	3,968,885	591	5,717
Oct. 1957	5,401	2,683	78	413	2,146	81	21,827,406	1,111	83	11	27	990	5,113,626	665	5,544
Cum. 1957	49,490	25,430	582	3,562	18,922	994	204,118,046	10,828	1,094	96	358	9,280	50,750,787	7,213	.....
Cum. 1956	53,553	28,414	409	3,785	20,039	906	215,536,225	11,933	1,505	....	415	10,013	56,883,452	....	.....

Note: C.T.—Cable tool compl. Act. op.—Active operations. D.D.—34; Okla. 19, Mont. 1, Ill. 2, Calif. 6, Miss. 1, Texas (3) 1, S. E. N. M. 2, W. Texas 2.

Western Canada

	Total wells					Cum.	Wildcat wells					Cum.
	Total	Oil	Gas	Dry	Footage	1957	Total	Oil	Gas	Dry	Footage	1957
Alberta	104	58	11	*35	558,742	1,322	40	6	6	28	213,016	379
Saskatchewan	77	57	3	*17	331,845	1,116	20	5	1	14	82,159	272
Manitoba	11	7	0	4	26,402	206	3	0	0	3	9,446	62
British Columbia	7	1	3	3	40,499	80	4	0	3	1	28,916	52
Northwest Territories	0	0	0	0	0	3	0	0	0	0	0	3
Western Canada	199	123	17	59	957,488	2,727	67	11	10	46	333,537	768

*Incl. 1 service well.

to Iosegun and Kaybob, a new Virginia Hills area wildcat, and a new depth record for Canada at Lambert Creek sum up the Alberta exploratory record for November.

Home Oil Co., Ltd., completed the third Virginia Hills region discovery at Edith Lake for an initial production of nearly 1,400 bbl. per day from the Slave Point-Devonian. This well was announced earlier this year as a discovery, but muskeg conditions slowed down completion until winter.

The Slave Point discoveries in western Canada this year . . . Virginia Hills, Swan Hills, Edith Lake, Kaybob, Iosegun . . . are the first such producers in Alberta. All of the new-pay strikes have been prolific producers. They lie in northwestern Alberta, stretching from Swan Hills on the east to Kaybob on the west. During November follow-up wells were announced for Kaybob and Iosegun plus a new Cambrian test in the Virginia Hills area. Phillips will drill a second try 2 miles from the Kaybob discovery; California Standard and British American will drill one at Iosegun. Shell Oil Co. will go to the Cambrian at its new Virginia Hills area wildcat, 7 miles south of the discovery well.

New B.C. field . . . The newest oil field in British Columbia is Imperial et al. East Alces, 2¾ miles northeast of the Alces discovery well in the Boundary Lake area. Production at this northeastern B.C. oil find is from the Triassic.

Depth record falls . . . The Lambert Creek Devonian gas discovery in the Alberta foothills belt is also the coun-

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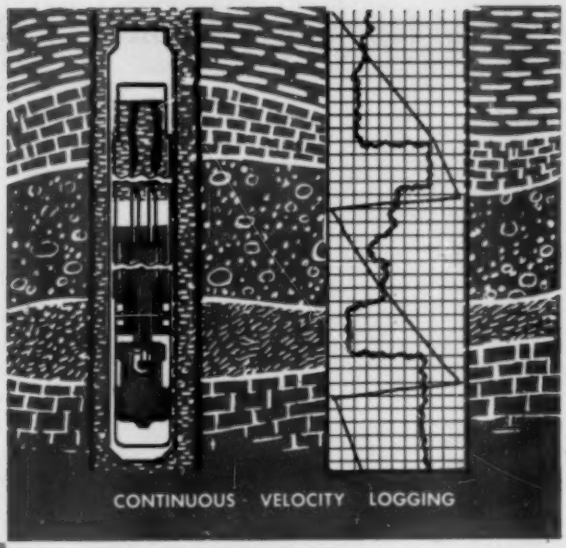

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Breakdown of Field Wells Drilled in November 1957, by Depth

	Oil									Gas									Dry								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Alabama							1																				
Arkansas	3	34	5	1	1						1			1							5	2	6	2			
California	34	27	15	13	18	12	6	3	1					5					8	2	2	5	1	3	1		
Colorado	2	2		6		1						2	1	5	1	1						3	3	1			
Illinois	11	29	31	4						2									15	29	42						
Indiana	4	15	13																7	16	4						
Kansas		25	90	32								11	5	4						15	44	35	7				
Kentucky	16	21	1								5	14							26	13	4	2					
Louisiana	9	39	11	7	19	27	16	20	4	1	3	3		2	4	4	2		3	6	19	5	2	16	12	14	5
North	9	38	11	4	6	1				1	3	3			3				2	5	19	4	1	1			
South		1		3	7	20	15	17	4					1	1	3	1		1	1		1	1	11	9	11	5
Offshore					6	6	1	3						1		1	1							4	3	3	
Michigan		2	4	3																2	3	1	1				
Mississippi						4	3															1	5	1	1		
Montana		9	2			5														1	5	1	2	1			
Nebraska					18																	2	12				
New Mexico		10	26	21	24	2	13	3			6	11	3	13					1	5	2	4	2	1		1	
Northwest		6	1	2	16						6	10	3	13					1	4		1	1				
Southeast		4	25	19	8	2	13	3				1								1	2	3	1	1		1	
New York	17											1							18								
North Dakota			5		5	8	2																2				
Ohio	13	5	33							2	5	7	1						11	2	14	2					
Oklahoma	48	63	91	35	25	12	1				2	6	2	3	2				31	51	69	10	17	3	1	1	
Pennsylvania	5	8								1	1	3		10						7	6		1				
Texas	68	165	170	129	193	61	13	3		2	14	15	6	14	7	2			38	89	39	40	50	29	3	1	
Dist. 1	7	3	10	1	3					1	1					1			4	15	1	3	3				
Dist. 2				5	7	6	1					2	3	5	1				1	1	1	6	2	8			
Dist. 3		3	9	4	16	19	3							1						4	4	2	2	10	2		
Dist. 4		9	8	3	13	3					1	2	1		1				1	9	2	1	16	4			
East	5	13	6	1	32	4													2	1		2	8				
Dist. 7-B	19	41	14	18	10						1	2							12	20	9	13	2				
West	9	26	87	78	85	22	9	3				3	1	3	1				1	7	12	7	6	5	1	1	
Dist. 9	28	63	8	15	21	3				1				5					17	32	6	5	9				
Dist. 10		7	28	4	6	4					11	6	1		4	1					4	1	2	2			
Utah					14																		1				
West Virginia	1	4	1							1	17	9	8						2	1	1	2					
Wyoming	4	7	4		9		2				1		1						5	3	2	3	2	2			
Total U. S.	235	465	502	251	326	132	57	29	5	9	55	82	27	58	14	7	2		165	242	261	118	114	59	18	17	5
Western Canada		8	12	64	16	12				1	3		2		1					3	3	5	2				
Alberta		2	6	16	16	12				1	1		2		1					1	3	1	2				
Saskatchewan			5	47							2											3					
Manitoba		6	1																	1							
British Columbia				1																1		1					

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

Breakdown of Wildcats Drilled in November 1957, by Depth

	Oil									Gas									Dry								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Alabama																						1				1	
Arizona										3																	
Arkansas			1											1					1	1	10	4					
California				1	1	3	1	1					1						5	1	6	4	6	10	1		
Colorado			1	2	2								1							1		11	12	5	1		
Illinois	1	1	2																13	23	10	1	1				
Indiana	1	1																	1	6							
Kansas			5	3	1									1						2	15	22	3				
Kentucky	1																		23	8	2	2					
Louisiana			2		1	1	4		1							1			1	2	1	3	9	10	7	4	2
North			2		1	1													1	2	1	3	8	4	2		
South							4		1															5	4	3	2
Offshore																1							1	1	1	1	
Michigan																			1	2	4	2					
Nevada				1																		1	9	3	4	2	
Mississippi						1													2	3	1	4	7	1	2		
Montana				1	1																2	7	24				
Nebraska																			1								
New Mexico				1			1												1	2	3	1	1				
Northwest																			1	2			1				
Southeast				1			1														3	1					
New York													1									3					
North Dakota			1		2																4	2	2	1			
Oklahoma	1	1		2	3	2							1	3	1				5	12	12	6	15	5			
Oregon																								1			
South Dakota																						1					
Texas		7	4	3	13	6	5	2	1	1	1	1	1	1				1	16	62	39	50	59	24	9	2	1
Dist. 1					1	1					1	1							7	10	7	3	5		1		1
Dist. 2						1				1												2	5	4	1		
Dist. 3					3	1	1	1						1				1					6	6			
Dist. 4		2	1		3	1		1	1										2	2	3	3	3	3	2		
East																				3	2	6	8	3			
Dist. 7-B			1	2															3	19	11	15	9				
West		1		1	2	1	4												1	10	8	9	15	6	2	2	
Dist. 9		4	2		4														3	18	8	10	5				
Dist. 10						1																2	3	2	3		
Utah					1	1				1				1					2			4	3	3			
West Virginia													1														
Wyoming				1	2		1						1	1	1				1	4	3	1	7	6	2		
Total U. S.	4	10	16	15	27	14	12	3	2	5	1	3	8	5	1	1		1	73	129	112	130	158	69	26	9	3
Western Canada		1	4	3	2	1						2	2	6						4	18	6	9	5	4		
Alberta			2	1	2	1						2	1	3						2	9	4	6	4	3		
Saskatchewan		1	2	2										1						2	6	2	3	1			
Manitoba																					3						
British Columbia													1	2											1		

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

Footage Breakdown for November

	Fields			Wildcats		
	Oil	Gas	Dry	Oil	Gas	Dry
Alabama	11,456					17,375
Arizona					3,048	
Arkansas	106,649	13,064	78,054	3,105	5,758	50,989
California	490,361	32,034	82,720	59,683	4,144	173,136
Colorado	42,398	58,466	42,307	25,728	4,224	178,335
Illinois	177,180	1,168	195,614	8,894		97,482
Indiana	67,244		47,249	2,936		11,874
Kansas	536,944	79,512	355,540	35,143	5,755	161,281
Kentucky	50,399	51,877	60,870	535		44,144
Louisiana	1,023,269	136,891	656,918	86,173	10,893	325,127
North	170,425	42,572	102,641	21,165		127,242
South	709,555	64,380	447,093	65,008		157,931
Offshore	143,289	29,939	107,184		10,893	39,954
Michigan	29,028		23,063			25,180
Mississippi	70,916		55,859	4,160		156,421
Montana	66,973		43,731	9,556		100,093
Nebraska	110,016		85,104	9,815		188,392
Nevada						300
New Mexico	517,508	135,374	66,037	15,994		24,116
Northwest	108,602	131,649	18,323			9,474
Southwest	408,906	3,725	47,714	15,994		14,642
New York	17,000	2,730	18,000		3,343	12,180
North Dakota	140,114		13,255	16,500		44,156
Ohio	121,694	40,287	57,653			
Oklahoma	890,488	65,313	544,272	45,241	21,944	216,190
Oregon						9,004
South Dakota						4,882
Pennsylvania	22,780	91,026	32,289			
Texas	3,369,292	270,970	1,113,708	268,933	25,715	1,171,644
District 1	62,435	13,751	63,994	14,280	4,312	113,593
District 2	130,835	59,411	113,213	8,515	1,241	82,667
District 3	344,783	5,215	148,608	51,037	20,162	89,040
District 4	159,028	20,417	162,435	62,616		92,558
East	286,033		62,139			116,156
District 7-B	263,138	7,201	170,841	13,028		194,544
West	1,552,247	38,500	182,238	71,679		267,052
District 9	377,103	30,496	163,526	39,580		135,134
District 10	192,790	95,979	46,714	8,198		79,000
Utah	80,800		5,764	14,001	7,224	64,140
West Virginia	10,362	96,478	13,015		4,914	
Wyoming	106,367	5,740	57,862	28,163	19,978	140,944
Total U. S.	8,059,328	1,080,930	3,648,884	634,560	116,940	3,217,385
Western Canada	548,049	25,446	50,456	49,688	52,310	231,539
Alberta	297,073	20,746	27,907	33,003	27,996	152,017
Saskatchewan	231,900	4,700	13,086	16,685	7,312	58,162
Manitoba	14,851		2,105			9,446
British Columbia	4,225		7,358		17,002	11,914

try's deepest hole. Drilling is below 15,000 ft. The all-time record for Canada was offshore from Prince Edward Island on the East Coast at Owen Development Co. 1 Hillsbourough (14,696 ft.). The well will also be the deepest producer in the nation if completed in the D1 zone below 12,110 ft. (the present record at Waterton Park).

Rocky Mountains

Wyoming and Utah scored highest in Rocky Mountain wildcat success during November with an important northside Paradox basin discovery, an extreme northern Wind River basin gas strike, and first oil at Table Rock.

● The California Co. 1 Spratt, new Upper Cretaceous gas discovery in Freemont County, Wyoming, flowed 8,275 M.c.f. of gas per day from two zones, moving production to a sparsely tested area of the Wind River basin. Location is 24½ miles south of Black Mountain field.

● First oil production in Sweetwater County, Wyoming's Table Rock field, was established at The Texas Co.'s east extension to the Wasatch and Almond gas field. The well pumped 125 bbl. of oil per day from the Almond (Mesaverde-Cretaceous).

Paradox first . . . The first successful completion in the area north of the main Aneth trend in Utah's Paradox basin was reported by Reynolds Mining Co. at its Hatch Unit well, 12 miles north of the main producing area of the basin. The well flowed 733 bbl. per day on 1-in. choke from Paradox-Pennsylvanian perforations at 5,967-87 ft. This very important discovery is the first bright spot in a period of long wildcatting in the area north of Aneth field itself. It provides a key to future drilling between the two areas. The other three wells drilled on the Hatch block were failures.

Texas

A new gas discovery in the long-quiet Dalhart basin in the Panhandle, a new producing-depth record on the Gulf Coast, a new reef field in Howard County, extension of Pennsylvanian production in Hockley County, and Duval County in the southwest provided Texas wildcat news.

● The first wildcat news in some time in the Dalhart basin is Rip C. Underwood's 1 Peeler wildcat in northeastern Dallam County. The well flowed 17,300 M.c.f. of gas per day, indicating a new field 4 miles southeast of Kerrick.

● Phillips Petroleum Co. 1 O'Daniel is the new producing-depth record holder for the Texas Gulf Coast at 14,656-14,747 ft. in the Frio sand. Production is gas. The previous title holder was Pan American 1 Sanborn in Matagorda County, 1,679 ft. shallower.

● Nortex Oil & Gas Corp. 1 Shafer, a Howard County strike, is an addition to the U-shaped chain of reef fields stretching from Scurry County southwest to Howard County, thence northwest to the middle of Hockley County in West Texas. Production is from the Pennsylvanian.

● Another important Pennsylvanian discovery in West Texas is Felmont Oil Co. 1 Phillips in central Hockley County. The 600-bbl. well moved Pennsylvanian production 7 miles west.

● Duval County, one of the oldest drilling and producing counties in Southwest Texas, leads all South Texas counties in drilling, both wildcatting and development. So far this year operators have tapped 26 new fields in the county.

Lower Cretaceous Play

The list of fields producing from Lower Cretaceous formations in Mississippi continues to grow. The latest addition is 13-year-old Eucutta field in Wayne County. The discovery well is Gulf Oil Corp. 1 Green, a 233-bbl. well in the Paluxy.

San Joaquin Valley

California offered two contenders for monthly honors, both of them in the Kern County area of the San Joaquin Valley.

● Union Oil Co. of California 82-21 found a Miocene pool about ½ mile east of Stenderup field on the west flank of Mountain View field, completing it for 1,200 bbl. per day.

● Reserve Oil & Gas Co. 388-18 Reserve, confirmation well to recently opened North Tejon field, flowed 1,300 bbl. per day from the Vedder sand of Eocene age. This brings considerable new interest to the field as the discovery well only made 244 bbl. daily. **End.**

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EXPLORATION HIGHLIGHTS

ALASKA

Second Kenai Test Drilling Ahead

Richfield Oil Corp. was drilling ahead below 8,184 ft. on 2 Swanson River Unit—the second test of the Swanson River Unit on the Kenai Peninsula. This site falls about 2 miles south of 1 Swanson River—the discovery well. Richfield and Standard Oil Co. of California are in the process of switching over from Richfield to Standard as operator.

On the Alaskan Peninsula Humble Oil & Refining Co. was drilling below 5,500 ft. on 1 Bear Creek Unit in the Widebay-Kanatak area.

APPALACHIAN

EASTERN KENTUCKY

Card Creek Wildcat Drilling Ahead

A wildcat test for Pike County, United Fuel Gas Co. 8503 John S. Cline is drilling ahead with cable tools at 2,944 ft. Located on Card Creek test, has a wellhead elevation of 1,112 ft. Formation tops encountered to date include: Ravencliff at 1,795 ft. and Mississippian Big lime 2,460 ft.

OHIO

Pure Stepout Finds Clinton Showing

Pure Oil Co. 2 William Sevitts, Lot 5, Union Township, Knox County, a ⅓-mile stepout, found Clinton sand at 3,018-73 ft. with a fair showing natural and 81 bbl. in 24 hours after fracture.

East Extension at New Guilford Hits Oil

An east extension at New Guilford made 90 bbl. in a 24-hour test at 3,188 3,233 ft. The completion was by Dunhill et al on 1 J. S. Shuy, Section 8, Perry Township, Coshocton County.

Third Weed Well Makes 400 Bbl.

In the Walhounding area in New Castle Township, Coshocton County, Roy Weed's third well on the M. W. C. District made 400 bbl. oil and an estimated 1,000,000 cu. ft. of gas after fracture. Clinton sand at 2,860-2,910 ft. filled 600 ft. natural.

WEST VIRGINIA

Magnolia Area Wildcat Fails To Produce

In Magnolia district, Mingo County, West Virginia, Carnegie Natural Gas Co., in 20-1705 U. S. Steel Corp., elevation 1,716 ft., was unsuccessful in its second attempt to find gas in the deep formations on this lease. The well finished at 5,711 ft., in a lime formation. It was plugged back to the Big lime where it had 100,000 cu. ft. gas at 2,854 ft. and 2,874 ft.

● In Williamsburg district, Greenbrier County, Columbian Carbon Co. could not fish out the string of tools in 1-1235 Pattie Beavers which had reached a depth of 5,853 ft., where the fishing job was encountered. The hole was bridged at 3,575 ft., and cemented from 3,535-50 ft.

Green Bank district, Pocahontas County, this company cemented 7-in. casing at 6,167 ft. in 1278 U.S.A.

ARKANSAS

Arkansas Valley Lease Map Available

The North Arkansas Oil Scouts Association has provided a real service to the oil industry by publishing the Lease Map of Arkansas Valley area. The map shows the results of an intense leasing campaign that has been in progress for the past several years across the northern part of Arkansas. It is a strip 50 miles from north to south that extends from the Oklahoma-Arkansas boundary to the Mississippi River. Scale of the map is ½-in. equals 1 mile and the map is 42 in. by 100 in. It is particularly useful to oil and gas companies because it is divided up into sections, townships, and ranges. Leaseholders are shown with the information up-to-date as of November 1957. Field wells and dry holes are accurately spotted.

The importance of the northwestern Arkansas play is apparent from the fact that 1 million acres have been leased in the area during the past 12 months. Currently there are about 20 rigs active in the gas fields and in wildcat drilling. At the present time, the Lease Map of Arkansas Valley Area is the only published map on the land activity to date. For details contact: North Arkansas Scout Check, Ward Hotel, Fort Smith, Ark.

CALIFORNIA

Richfield Misses With Windgap Extension

Richfield Oil Corp. plugged and abandoned the 11,579 ft. 84-26 Richfield-Springman-Sunray as an unsuccessful effort to extend its new pool discovery scored last spring about ¾ mile northwest of the Windgap area of Wheeler Ridge field. The abandoned 84-26 Richfield was located about ½ mile north of the spring discovery.

New La Honda Test Slated

Transierra Exploration Co. was rigging a rotary to drill a wildcat about a ¼ mile south of the recently abandoned United Cuban Oils, Inc. 1 Muller in the La Honda region of San Mateo County. The Transierra well, 2 Muller, is located about ½ mile southwest of the nearest production in the old producing area. The United Cuban 1 Muller was drilled to 2,719 ft. On a production test, it flowed only salt water. Both tests are in 17-7s-4w.

Union's Two Mountain View Pools Get Big Producers

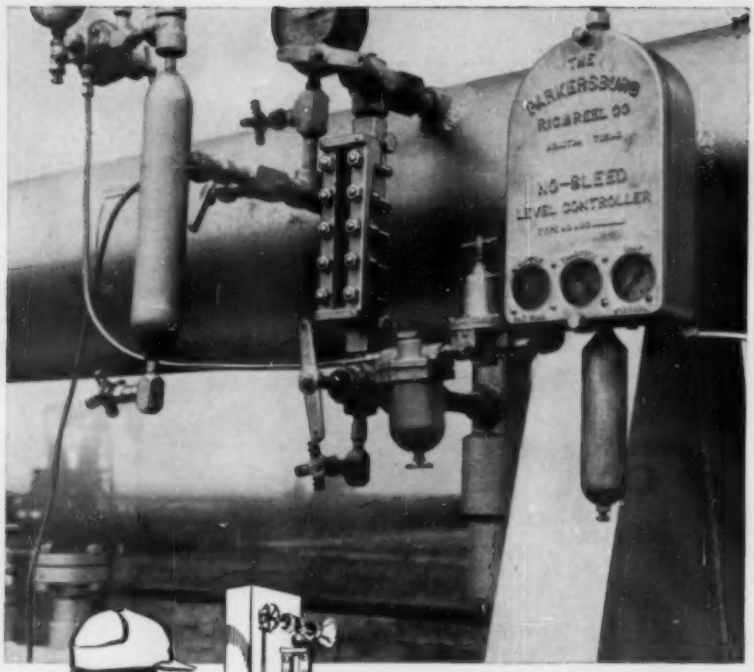
Union Oil Co. of California added two good producers to its new Stenderup and Houchin pools in the Mountain View field area of Kern County.

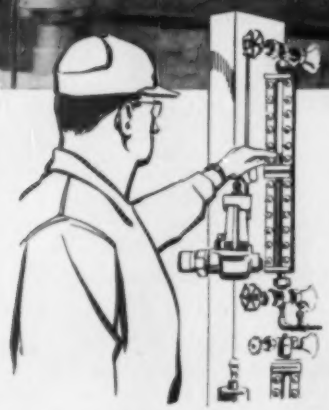
The 8,372 ft. 55-27 Union-Hancock-Houchin-Guimarra was completed as a northwest extension ½ mile from the Houchin pool. Initial production from an interval at 8,266-8,372 ft. was 823 bbl. daily of 35°-gravity crude through a 24/64-in. choke.

The Stenderup well was 13-22 Union-Hancock-Tupman in SW NW 22-31s-29e. This is about a ½ mile

EXPLORATION THIS WEEK

Alaska	277
Appalachian	277
Arkansas	277
California	277
Canada	278
Louisiana	285
Michigan	288
Mississippi	288
Nebraska	290
Nevada	294
Oklahoma	297
Rocky Mountains	301
North Dakota	305
Texas	306





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northwest of the Stenderup discovery. Initial flowing rate was 625 bbl. daily of 33.5°-gravity crude from 7,698-7,785 ft.

CANADA

ALBERTA

Rocky Mountain Discovery Reported at Shell Well

Shell Oil Co. has a Mississippian discovery prospect at its Panther River wildcat 28 miles north of Banff in the Rocky Mountains.

Drill-stem tests showed gas and oil-cut mud. The well is an indicated discovery for a mountainous area 63 miles northwest of Calgary on LSD 5, 19-30-10w5. From 6,441-6,507 ft. recovery was 220 ft. of gas and oil-cut mud; from 6,440-6,507 ft. recovery was 260 ft. black, heavily gas-cut mud with strong hydrogen sulfide odor. Drilling continues below 6,690 ft.

Location Staked for Wildcat In Fort Vermillion Area

Sinclair Canada Oil Co. staked location for a rank wildcat about 20 miles south of Fort Vermillion and 145 miles northeast of Peace River in northern Alberta.

The Fort Vermillion well will go to the Precambrian at about 4,000 ft.

Kaybob Pipeline Nears Hookup Time

The Kaybob oil producing region later this month will establish a record for the pipeline industry of western Canada, for although there are only two oil completions in the area, a transmission line has been constructed and is expected to go into operation shortly. Operator of the line will be Britamoil Pipeline Co., the same firm that operates the Peace River oil pipeline that runs out of the Sturgeon Lake oilfields to the Edson pumping station of the Trans Mountain line.

The link between the Kaybob producing region and the Peace River line which is about 12 miles in length will have a capacity of 24,000 bbl. daily and will initially be flowing at a very small percentage of the capacity. Although flowing at the small rate the line, during thaws will undoubtedly prove its worth as roads presently used for the transmission of the crude to refineries in Grande Prairie, will become impassible.

Some idea of the potential of the area is indicated by the construction of this 8⅝ o.d. line at the present

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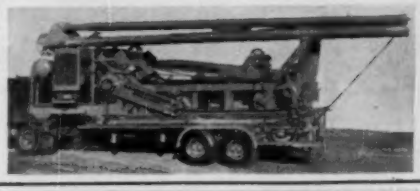

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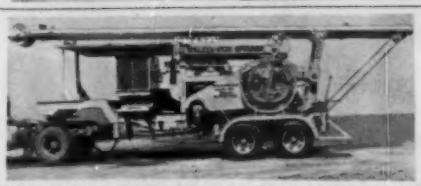
- ☐ C-33—4,000′
- ☐ C-32—3,000′
- ☐ C-31—2,000′



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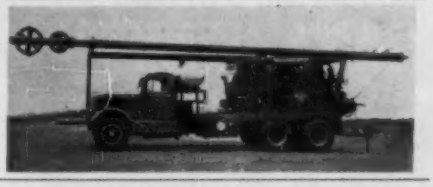

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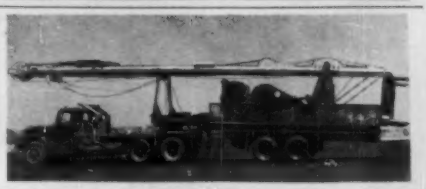

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time. Production now is coming from a pair of wells 4 miles apart but another three rigs are currently under way in the same general area trying to boost that total.

SASKATCHEWAN

Far Removed Wildcat Slated Near Prince Albert

A rank wildcat is slated for the Prince Albert area of south-central Saskatchewan, many miles from production. Okalta Oils, Ltd., of Calgary spudded the granite test last week after many months of exploratory work in the area. Survey work included the airborne magnetometer, the gravitymeter, and seismograph.

The new well is Okalta et al 13-34 Hagen, LSD 13, 34-45-25w2, 5 miles northwest of a location (never drilled) at Britalta 1 Tiger Hills. It lies 20 miles northwest of Hudson's Bay 1 Yellow Creek, a dry wildcat hole.

Canbridge Corp., Ltd., is contractor for the project that began December 16. The well will test all possible pay zones on the way down to Precambrian at about 4,100 ft.

Casing Record Being Set At Hummingbird Wildcat

Imperial Oil Co. has set casing at 10,320 ft. at its Hummingbird wildcat 17 miles northeast of the Outlook area of northeastern Montana. This is the deepest point at which pipe has been set in Saskatchewan. This important wildcat has found Ordovician oil shows below 9,949 ft. If successful, it would open first Ordovician production in western Canada.

Important Strike Looms at Lomond

It appears that the year 1957 will close out with real success nears for the team of Hudson's Bay Oil & Gas Co., Ltd., Canadian Husky Oil Ltd. and Phillips Petroleum Co. at its current driller in the Armada-Lomond area of southern Alberta, about 65 miles southeast of Calgary. Although nothing official oil wise has been recovered from the section to date, it was learned that through cores and log information, a section in the Mississippian (Elkton) horizon was highly-porous and oil laden. No drill-site tests were taken of the interval, as the hole, up until a few days ago was kept on the restricted list, because of acreage up for sale in a nearby Drilling Reservation Tract.

The importance of the well, Hudson's Bay et al 7-34-16-20 Lomond, on LSD 7, 34-16-20w4, will not be known for a few days, as it was decided that instead of drill-stem testing saturated section it would be advisable to run production casing and then carry out further operations. This strike is in fairly virgin territory as only one well has been drilled within 10 miles of it and it lies 4 miles northwest. Incidentally that venture, Pacific Western 1 Lake McGregor, was abandoned after failing to indicate commercial production; while the most recent previous completion, Shell 7-25-16-22 Armada, was also dry and abandoned. Both of those wells penetrated the sector in which this test found its oil, but no indication of the crude was present.

Data so far accumulated on the strike indicated a net pay sector of 68 ft. below 4,312 ft., at which depth the Elkton sector of the Mississippian was contacted. Gross pay thickness apparently was 128 ft. and porosity averaged out to 16.1 per cent.

The well was drilled by Hudson's Bay on acreage acquired under farm-out agreement from the Husky-Phillips team who are the major landholders in the immediate vicinity of the discovery.

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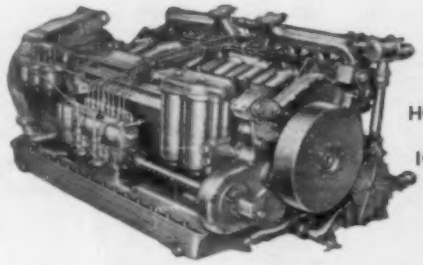
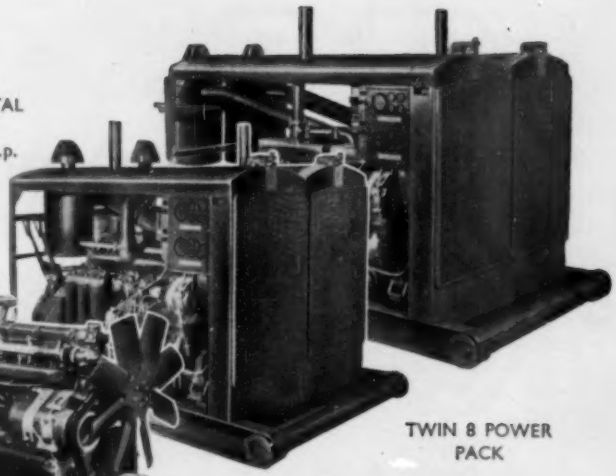
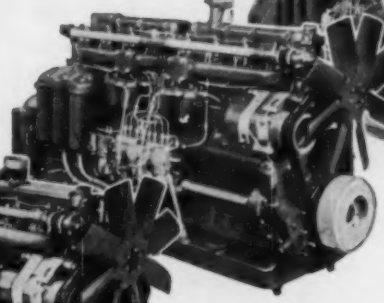


HORIZONTAL ENGINE
100-300 b.h.p.



TWIN 8 POWER PACK



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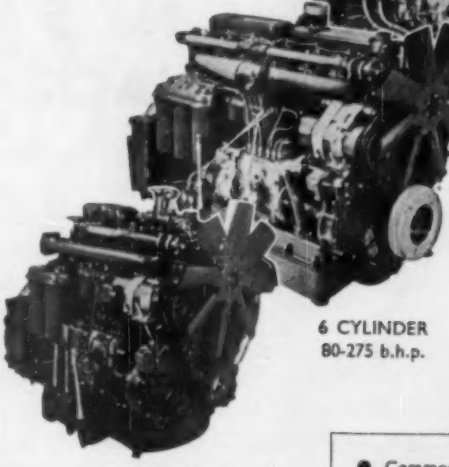
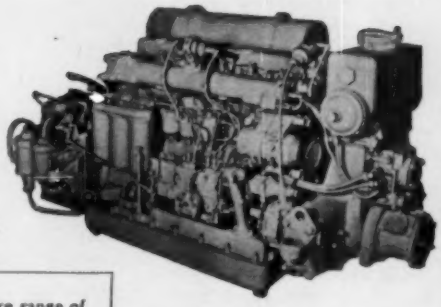


6 CYLINDER
80-275 b.h.p.



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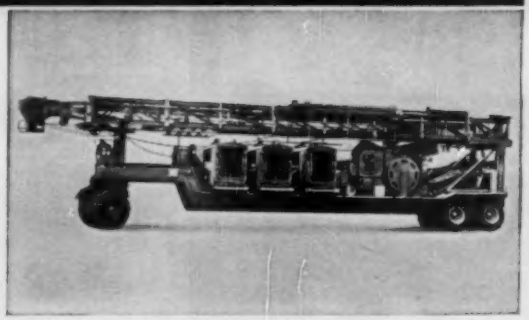

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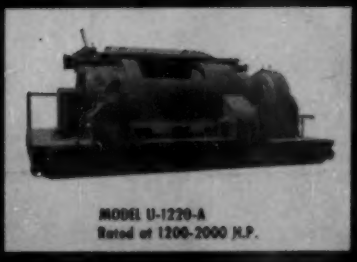

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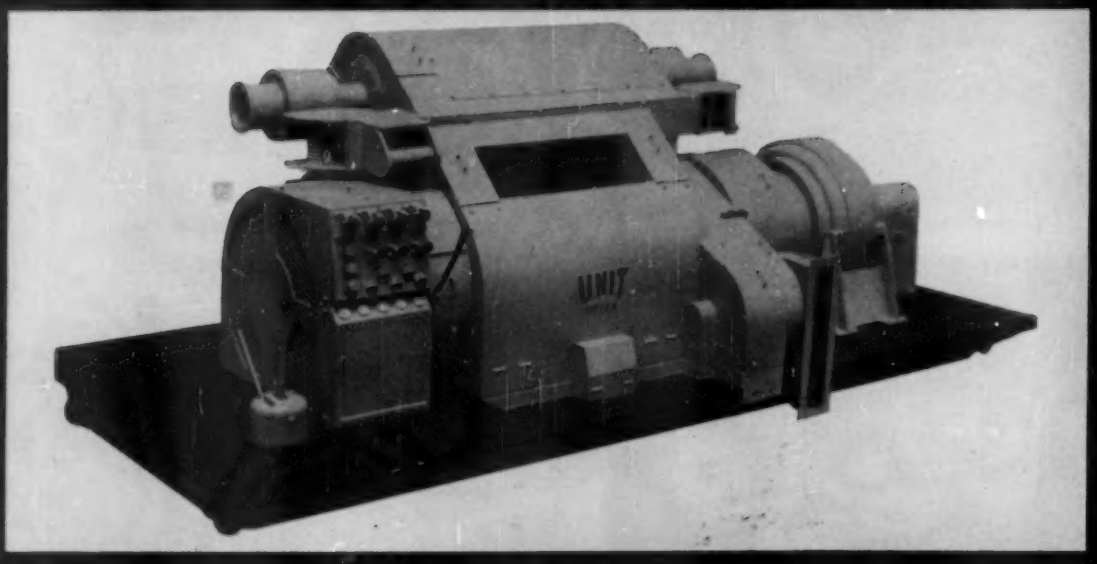

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LOUISIANA

NORTH

Deep Pay at Colquitt Gets 2-Mile Extension

A major extension is recorded for the deep Haynesville production of Colquitt field, in Claiborne Parish.

It is about 2 miles northwest of the field where Placid Oil Co. has a new well flowing at the rate of 223 bbl. of 49.1°-gravity oil per day through 13/32-in. choke from that pay.

Pay is perforated at 9,732-46 ft. Hole is plugged back after drilling to 10,915 ft. in the Smackover.

The well is Placid's 1 Odom et al Unit, in 20-23n-6w.

SOUTH

Deep Sand Produces in St. Mary Parish Wildcat

British-American Producing Co. reports final completion of its new-field discovery well southeast of Morgan City, in eastern St. Mary Parish.

The well, 1 Intercoastal Shipyard, gaged 48 bbl. of 49.5°-gravity condensate and 2,216,000 cu. ft. of gas per day, flowing through 3/32-in. choke. Flow was under pressure of 9,750 psi.

Produtcion is from perforated interval at 14,682-14,850 ft. Pay is in hole drilled to 15,063 ft.

The discovery has been designated as Ramos field.

British-American is near the producing level in its first confirmation attempt. A previous test, drilled by California Co., in the area was abandoned at 11,908 ft.

Second Well Confirms Bay St. Elaine Discovery

Confirmation of a deep discovery in the Bay St. Elaine area of Terrebonne Parish, has been made by John W. Mecom.

Two pay zones below 13,000 ft. have been tested in each of two wells drilled so far on a 4,630-acre block located on the north flank of the Bay St. Elaine field, 25 miles south of Houma. Richardson & Bass (Louisiana Account) also has an interest in the acreage.

The Mecom wells are 3,500 ft. north of nearest production in the area, but are producing from two new reservoirs.

His discovery well, No. 1 State Lease 2995-LL&E Unit 3, was completed dually last October. The No. 2 confirmation well 1,365 ft. southeast, successfully tested the same formations.

The upper zone in the latter well (perforations 13,470-80 ft.) flowed at the rate of 433 bbl. of 31.8°-gravity oil per day through 9/64-in. choke. Tubing pressure was 2,950 psi. and gas-oil ration 765 cu. ft. per barrel.

The lower zone (perforations 13,881-87 ft.) tested 456 bbl. of 28.2°-gravity oil through a ¾-in. choke with gas-oil ratio of 561 cu. ft. per barrel.

The discovery well now dually completed, flowed at the rate of 438 bbl. per day through 5/32-in. choke from perforations at 13,526-36 ft. in the "C" sand. The upper sand tested at the rate of 428 bbl. per day through 5/32-in. choke from perforations at 13,414-30 ft. in the "A" sand.

Mecom is preparing location for his third well, northwest of the discovery.

New Reservoir Opened At Jefferson Island

A wildcat location off the northwest flank of Jefferson Island dome, in Iberia Parish, has uncovered a deep gas-productive reservoir. Location is

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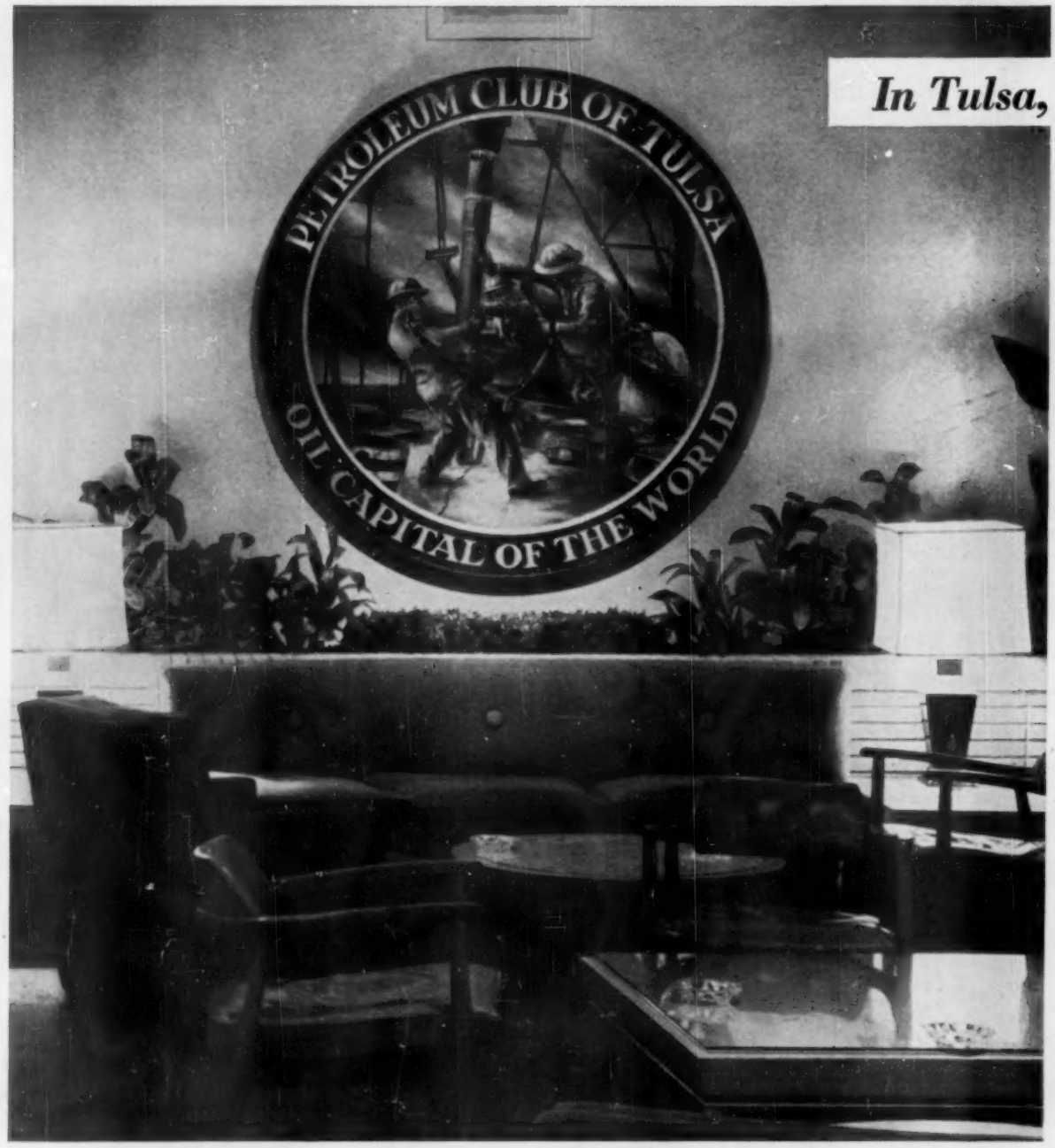

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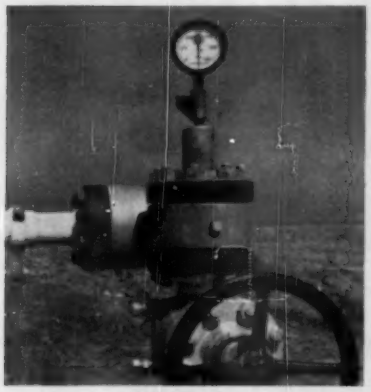

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about 1 mile northwest of nearest production.

It is Texaco's 13 State Lease 124, in Lake Peigneur, in Township 12s-5e.

Pay, perforated at 9,002-10 ft., tested good for 5,100,000 cu. ft. of gas and 19 bbl. of 47.6°-gravity condensate per day when gaged through 9/32-in. choke. Flowing pressure was 3,650 psi.

MICHIGAN

Reworked Salem-Dorr Well May Lead to New Play

Re-work of an old well in Salem-Dorr field, Allegan County, where fracture in Salina section substantially increased production may lead to increased development. Ford Oil Co. 1 Helmer, SE NE NE 25-4n-13w, originally was completed in Detroit River zone at 2,109 ft. for 5-bbl. well. Deepened into Salina at 2,742-95 ft. well made 8 to 12 bbl. oil.

Oil fracture with 500 bbl. raised production to average of 75 bbl. day on 4-day test after load oil recovery.

The Salina section was first opened 1 year ago but new drilling and deepenings have been mediocre up to now.

Mason Wildcat Finds Traverse Show

Miller Brothers 1 Harmon, SW SE SE 10-17n-17w, Mason County wildcat 5 miles northeast of Pentwater oil field, carried good show oil in Traverse lime at 1,647-52 ft. and will be acidized. It was most promising of current exploratory activity in state.

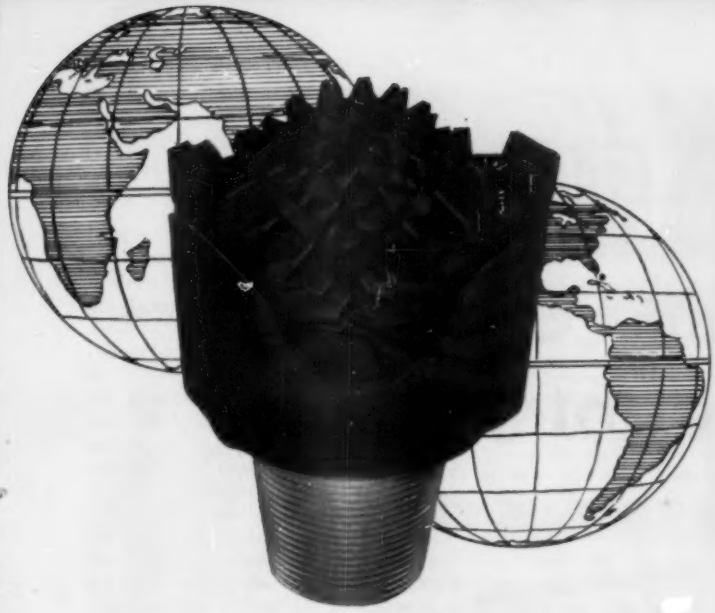
MISSISSIPPI

Mississippi Geologists Have New Reference Book

Mississippi Geological Society has supplemented its 1952 reference volume on fields in the Eocene Wilcox trend of southwestern Mississippi with a greatly enlarged volume covering Mesozoic and Paleozoic producing areas of both Mississippi and Alabama.

The volume, edited by Xavier M. Frascogna, contains a compilation of detailed field data, maps, cross-sections, and composite logs. Two composite electric logs, one for the Mesozoic and one for the Paleozoic, are provided in lieu of a type section for each field.

The society points out that this has been done because stratigraphic divisions of the Lower Cretaceous and older formations of the Mississippi salt basin and the Black Warrior basin



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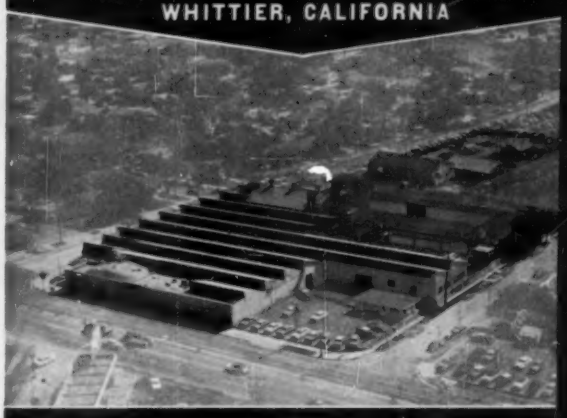

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still are subject to considerable controversy, and future revisions are believed inevitable.

The volume uses the fold-in plan whereby an up-to-date log can be substituted readily.

Although the "cut-off" date for field maps and well data was January 1, 1957, field maps are posted, when it was convenient to do so, through the first 4 months of 1957.

The society states:

"Since the publication in 1952 of the reference volume on fields in the Eocene Wilcox trend of Southwest Mississippi, the Mississippi Geological Society has recognized the pressing need for a similar volume on the remaining fields of Mississippi and Alabama. It is the sincere hope of the society that this reference volume will prove a valuable aid in attacking the problems of oil finding in this area."

The volume is available from the Mississippi Geological Society, Jackson.

Eutaw Sand Produces in Clarke County Discovery

Carter Oil Co. has a new Eutaw oil discovery in southeastern Clarke County. It is about 9 miles southeast of Quitman. Nearest current production is in the Langsdale field, about 6 miles southeast. It is about 5 miles southeast of the inactive Quitman field.

Carter's discovery well, 1 Carmichael-Thompson Unit, in 32-2n-17e, produced 47 bbl. of oil and 61 bbl. of water in 6 hours of swabbing. It did not flow, and now is being put on the pump for completion. Gravity of the oil is 14.4°.

The well was drilled to 4,210 ft. in the Tuscaloosa section. Perforations are at 3,747-55 ft., opposite a stringer sand in the Eutaw formation. When tubing was run before swabbing, fluid rose 1,500 ft. in 15 hours.

NEBRASKA

CAMBRIDGE ARCH

Oil Bailed at New Hitchcock Prospect

The Cambridge arch area of southwestern Nebraska apparently has another discovery. Brack Drilling Co. recovered oil at the hourly rate of 5 bbl. on a 24-hour bailer test of its 1 Hudson in C NE NE 1-1n-34w. Production is from the Lansing-Kansas City of Pennsylvanian age at 4,082-88 ft. Nearest production is 23 miles to the southwest in Dundy County.

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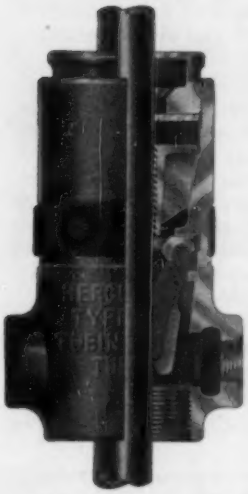

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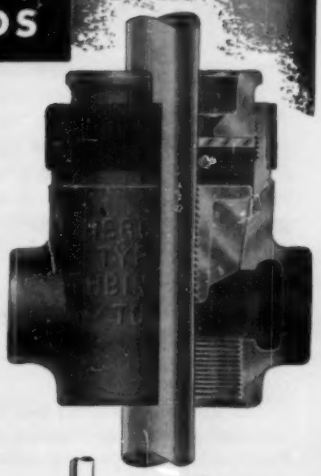

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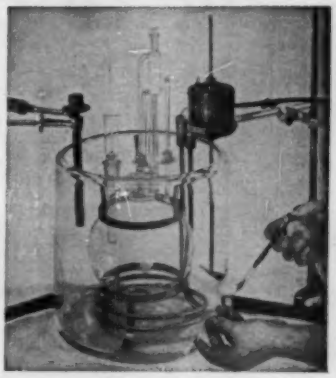

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Dr. A. I. Levorsen explains why . . .

Paleogeologic Maps

are important in oil finding

PALEOGEOLOGIC MAPS are a valuable asset to the oil finder, according to Dr. A. I. Levorsen, consulting geologist, Tulsa, and distinguished lecturer for the American Association of Petroleum Geologists. In a recent interview he declared "Paleogeologic maps are helpful in solving many local problems and are also useful reconnaissance tools in a variety of regional problems."

The data may be from well records, aerial maps, or a combination of both. Paleogeologic maps help solve such problems as:

Geologic history of an area or oil province.

Are we looking at truncation or shore line?

Locating wedge belts of rocks.

Time of oil and gas migration.

Preunconformity structure.

Sources for postunconformity sediments.

Paleohydrodynamic gradients.

Continental drift.

Dr. Levorsen is one of several distinguished lecturers who are sponsored each year by the AAPG to visit the various geological societies throughout the United States and Canada. Levorsen's lecture will cover the topic "Some Applications of Regional Paleogeology."

Paleogeologic maps are an attempt to restore the geological pattern of a region at specific times in the distant past. These studies are most helpful in deciphering local geologic problems, and are indispensable for regional exploration problems by outlining areas which may be favorable for oil and gas accumulation, and which should be explored by more definite methods. They assist in locating buried shorelines, buried ancient land surfaces, studying time of oil and gas migration into sediments and studying paleohydrodynamic gradients.

In his talks, Dr. Levorsen will cite many well-known examples of the use of such studies from the Mid-Continental United States and several foreign areas. He will also show how the maps derived from these investigations can be applied to the fascinating problem of continental drift, a subject of heated discussion among geologists for many decades.

He was consulting geologist from 1935 until 1945, when he left the commercial world to become professor of geology and dean, School of Mineral Sciences at Stanford University, Palo Alto, Calif. Since 1951, he has been engaged in world-wide geological consultation, including South America, Europe, North Africa, southeastern Africa, and Australia.

Itinerary of Dr. A. I. Levorsen

January 2 — Evansville — Indiana-Kentucky Geological Society.

January 3—Chicago—Northwestern University.

January 6—Pittsburgh—Pittsburgh Geological Society.

January 7—Lansing—Michigan Basin Geological Society.

January 8—South Bend — University of Notre Dame.

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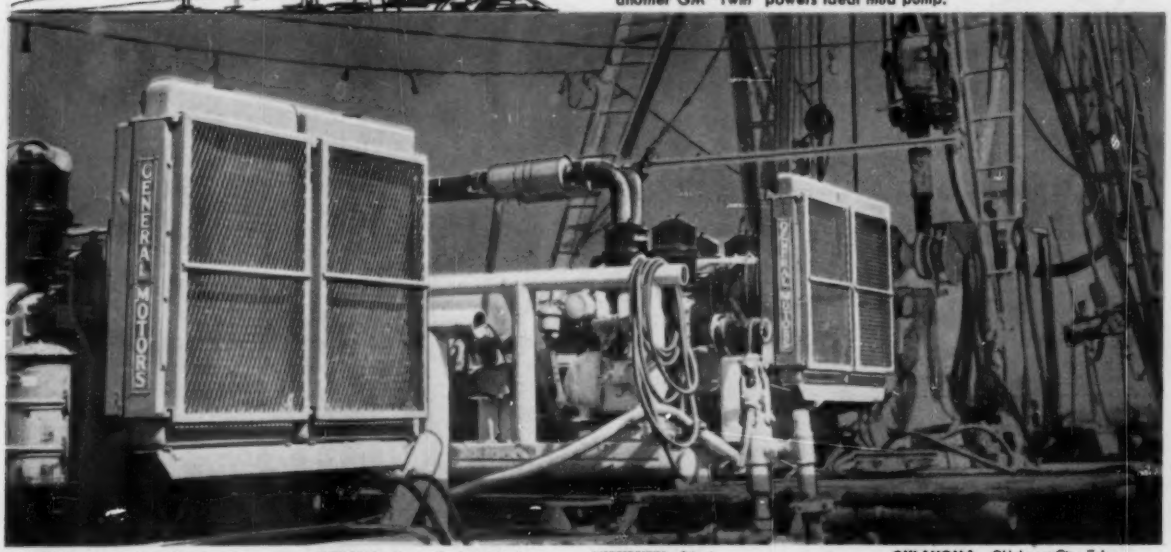

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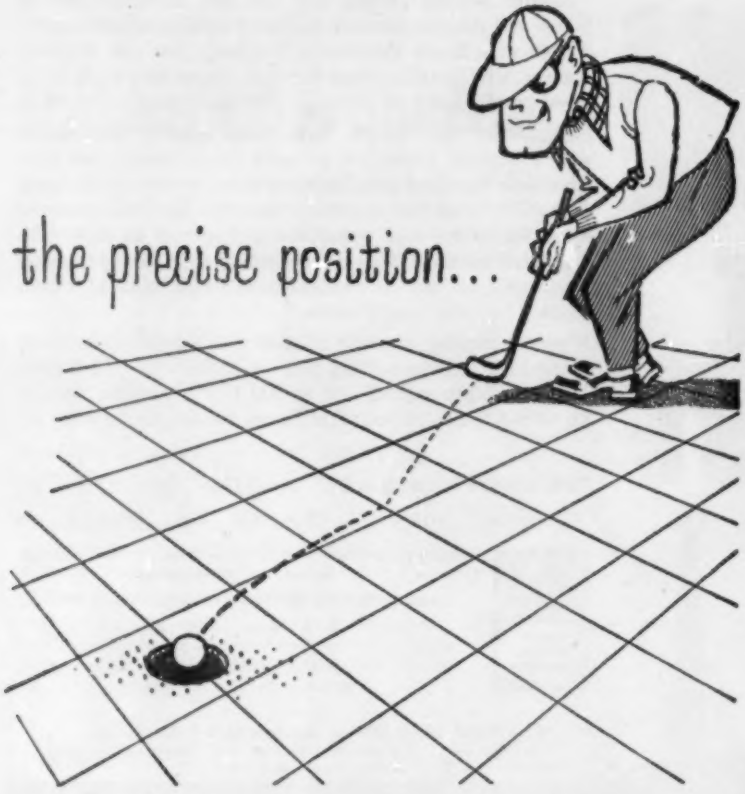

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January 22—Calgary—Alberta Society of Petroleum Geologists.

January 23—Billings—Billings Geological Society.

January 24—Bismarck—North Dakota Geological Society.

February 3—Liberal—Liberal Geological Society.

February 4 — Denver — Rocky Mountain Geologists.

February 5—Salt Lake City—Utah Geological Society.

February 6 — Casper — Wyoming Geological Association.

February 7—Laramie — University of Wyoming.

February 10 — Houston—Houston Geological Society.

February 11 — Beaumont — Beaumont Geological Society.

February 17 — Minneapolis—University of Minnesota.

February 18—Vermillion—University of South Dakota.

February 19—Lincoln—University of Nebraska.

February 20—Iowa City—University of Iowa.

February 21—Columbia — University of Missouri.

March 3—Lawrence—University of Kansas.

March 4 — Seattle — University of Washington.

March 5—Eugene — University of Oregon.

March 6—Sacramento—Sacramento Geological Society.

March 7—Palo Alto — Stanford University.

March 17—Ventura — Coast Geological Society.

March 18 — Bakersfie'd—San Joaquin Geological Society.

March 19—Los Angeles — Pacific Coast Section, AAPG.

March 20—Roswell—Roswell Geological Society.

March 21—Midland—West Texas Geological Society.

NEVADA

Nevada Drilling Report

Bonanza Oil Corp. was drilling ahead below 860 ft. with cable tools on 1 Government Consolidated about 12 miles southeast of Las Vegas in Clark County. Bonanza set 8⅝-in. casing to 740-ft.

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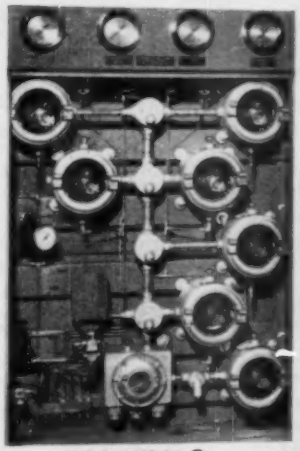

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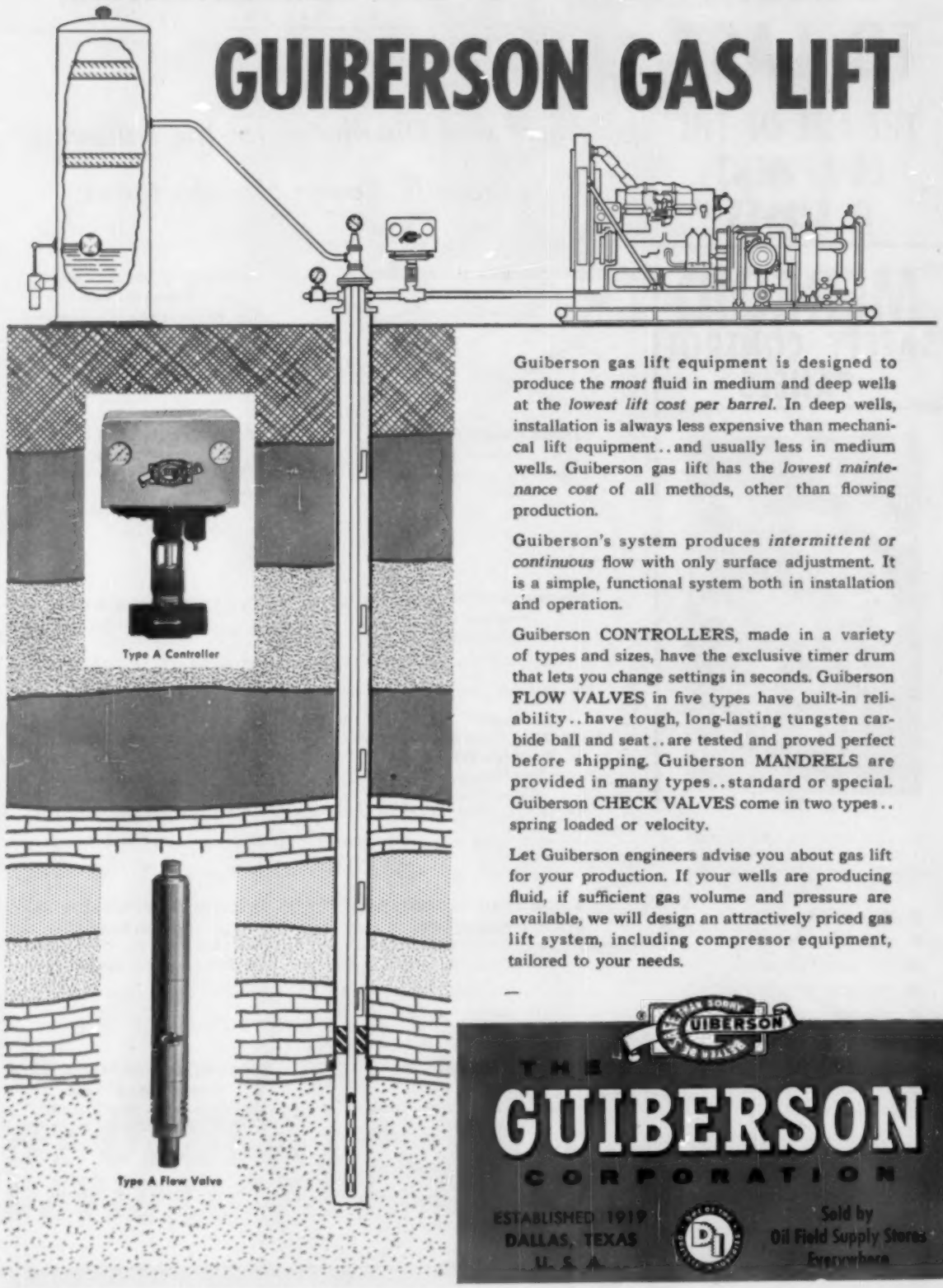

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Definition of a Geophysicist

A geophysicist is a person who passes as an exacting expert on the basis of being able to turn out with prolific fortitude infinite strings of incomprehensible formulae calculated with micromatic precision from vague assumptions which are based on debatable figures taken from inconclusive experiments carried out with instruments of problematic accuracy by persons of dubious reliability and questionable mentality for the avowed purpose of annoying and confounding a chimerical group of fanatics known as geologists who are themselves the lunatic fringe surrounding the honest and hardworking oil scouts and landmen. November 1957, from "The Shale Shaker."

OKLAHOMA

NORTHWEST

Cedardale Area Gains Third Gas Producer

The new Cedardale area in eastern Woodward County has its third gas well. It is Shell Oil Co. 1-24 State in C SW NE 24-22n-17w. The Chester-Mississipppian well flowed 2,600 M.c.f. of gas per day from perforations at 7,165-80 ft. Initial tests made 3,250 M.c.f. per day.

Morrow Gas Flows at Southwest Kibby Well

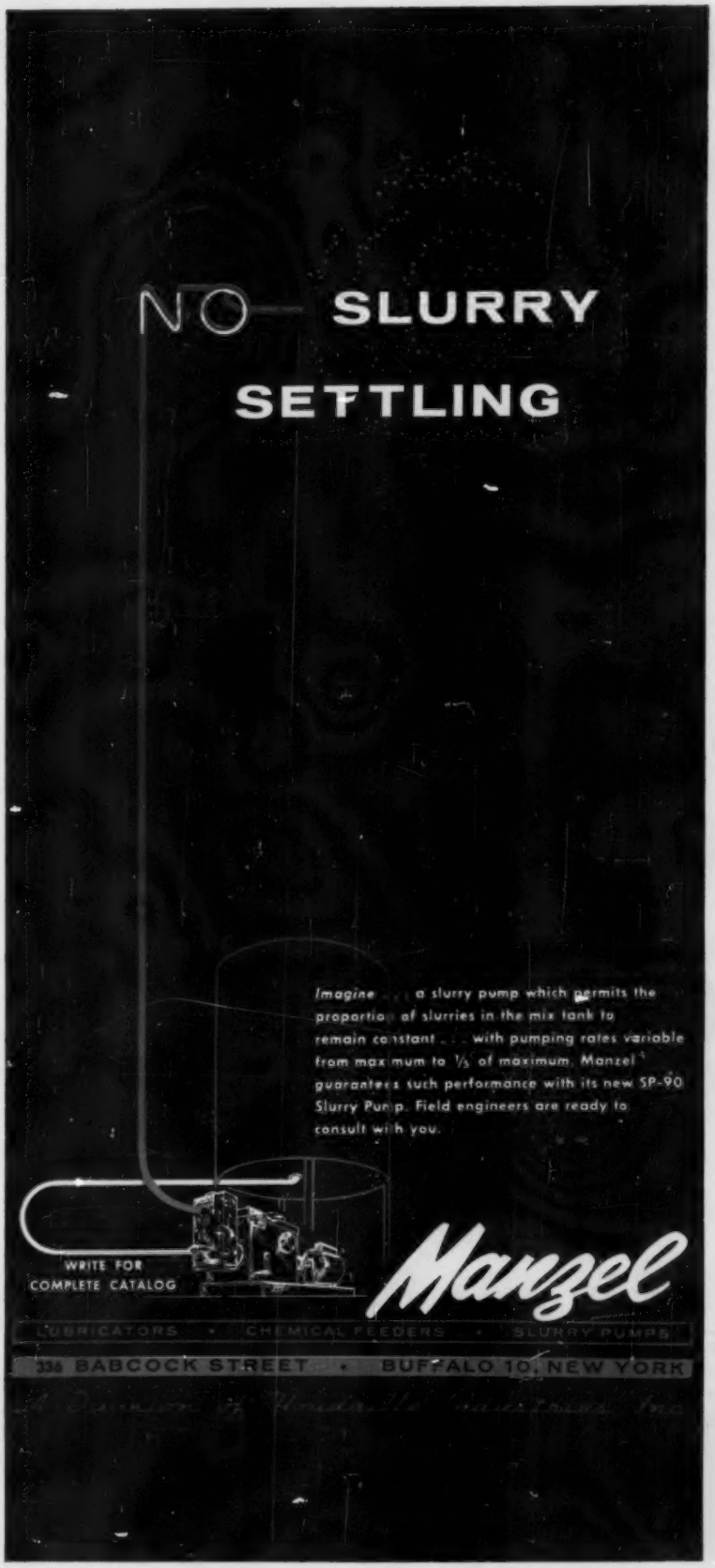
The second well in Southwest Kibby field, Harper County, flowed gas from the Morrow sand on tests. It is Woods Petroleum Co. 1 Moberly, C SE NW 28-26n-22w, east of the discovery well. Perforations were at 6,693-6,723 ft.

Third Well Added to Northeast Woodward Field

The new Northeast Woodward field, Woodward County, has its third well. Sinclair Oil & Gas Co. 1 Withgott, C SE NW 2-23n-20w, flowed 12,500 M.c.f. of gas per day and some condensate on tests of the Morrow sand at 7,561-83 ft.

Stepout Well Completed At Northwest Okeene

The west stepout well to Northwest Okeene field in Blaine County was completed by Pan American Petrole-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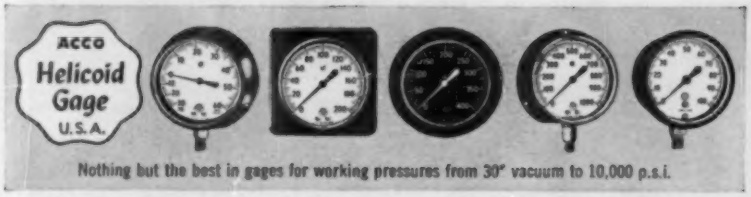

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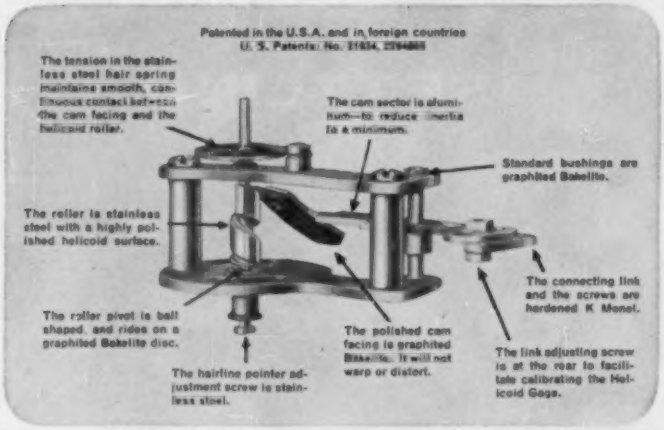
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um Corp. The 1 Outhier, C SE NW 8-19n-11w, flowed 1,259 M.c.f. of gas per day on ⅛-in. choke plus 28.8 bbl. of distillate per million on test of the Chester-Mississippian at 7,476-80, 7,522-26, and 7,542-46 ft.

Mussellem Is New Pay At Cedardale Well

A new-pay discovery is in line for the new Cedardale area of eastern Woodward County. Shell Oil Co. 1-24 State, C SW NE 24-22n-17w, which is the third well for the field, found gas in the Mussellem section at 7,382-88 ft. (Pennsylvanian). Regular field pay is the Chester-Mississippian.

PANHANDLE

Oil and Gas Flow At Texas County Discovery

Panhandle Eastern Pipe Line Co. 1 Reiss, C NW NW 11-5n-10eCM, east of Sturgis, flowed both oil and gas from the Morrow sand.

From perforations at 4,456-70 ft. the treated well made 32 bbl. of new oil per hour for 4 hours. It then flowed 4,000 M.c.f. of gas per day along with the oil.

Second Gas Zone Proved At South Glenwood Well

In Beaver County Shell Oil Co. proved a second gas pay at its 1 Lonker-C in C SW NE 1-5n-27eCM, South Glenwood field well.

From the Morrow sand at 6,177-6,234 ft. the well flowed 5,526 M.c.f. of gas per day on 1-in. choke; from the Mississippian - Chester it flowed 2,500 M.c.f. per day on ¼-in. choke from 6,257-82 ft.

Cities Service Testing At Camp Creek Well

Cities Service Oil Co. 1 Ferguson-E, Camp Creek well in Beaver County, NW NW SE 7-3n-25eCM, flowed 4,900 M.c.f. of gas per day with a spray of condensate on tests after fracturing. Pay is at 5,357-75 ft.

NORTH

Cherokee Sand Gas Discovery in Alfalfa

Gulf Oil Corp. and Dudley & Heath Drilling Co. 1 State, C NE SW 16-28n-10w, south of Amarillo field in Alfalfa County, is apparently a new Cherokee - Pennsylvanian gas discovery.

The well flowed 1,620 M.c.f. of gas per day on test of perforations at 4,914-27 ft. This new strike is in the general Cherokee trend that stretches across northern Alfalfa and Grant counties in extreme north - central Oklahoma.

SOUTHEAST

McIntosh Discovery Area Adds Its Second Well

The second gas well was found in the new McIntosh County area in NW NW SE 14-12n-16e. Oklahoma Natural Gas Co. and Brannan & Ferrell 1 Covey, flowed 3,000 M.c.f. of gas per day at the end of the opening during drill-stem test. The test was at 2,245-75 ft. The Brannan & Farrell 1 Lackey well in SE SE NE Section 14 is the discovery well of the new area, but is now shut in.

SOUTH-CENTRAL

Gibson Is New Pay At Arnoldview

Skelly Oil Co. 1 Stephens is a new-pay discovery for the Arnoldview area of McClain County. The well, located in NE SW 19-5n-2w, flowed

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Small but powerful, like the hardy Mustang of the prairies, the Alten D-6 "Mustang" is an all new unit designed especially for low-cost, long-term operation of waterflood projects and shallow wells. The "Mustang" is another indication of Alten leadership in pumping unit design. Ever since the first pumping units were built for early Pennsylvania fields, the Alten line has been continually improved and expanded. This great new unit is the recent result of Alten experience and advanced engineering technique.

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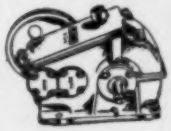

Completely new, engineered exclusively for this miles-ahead D-6 unit. Lower tooth pressures and longer life are provided by the extra width gear faces. New low-level oiling system is made positive by Alten's unique oil wipers. Double-ribbed reducer housing . . . oversized tapered roller bearings.

NEW FRAME

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LANCASTER, OHIO

17 bbl. of oil per hour natural from the Gibson sand at 7,058-68 ft. on 24/64-in. choke. A later flow was 5 bbl. of new oil per hour on 11/64-in. choke.

The discovery well in this area is a Frank Weimer and Associates discovery in SE SW 19-5n-2w. That well flowed 267 bbl. of oil daily on ⅝-in. choke from perforations at 7,151-7,236 ft.

Hunton Oil Found at Cleveland Prospect

A Cleveland County wildcat has indicated Hunton lime production. It is An-Son Petroleum Co. 1 French in SE SE NW 35-9n-1e, east of North Roulette Creek field.

A test at 5,576-96 ft. showed gas in 30 minutes at 60 M.c.f. per day. Recovery was 300 ft. of gas-cut free oil and 180 ft. of gas-cut muddy oil. Another test at 5,598-5,630 ft. netted 90 ft. of oil-cut mud, 30 ft. muddy, oil-cut salt water. The Wilcox section will be tested before completion is attempted.

SOUTH

High Flow Reported At Aylesworth Strike

A new-pay discovery in Aylesworth field, Marshall County, southern Oklahoma, flowed 90 bbl. of new oil per hour on test of the Woodford at 1,850-2,600 ft. The well is Blackwell Zinc Co. 1 Underhill, NW NE NW NW 5-6s-6e.

CENTRAL

Gas Gaged At New Oklahoma County Well

Gas was gaged at a new eastern Oklahoma County well, the Wolfe Drilling Co. 1 Skropka, NE NW SE 12-12n-1e.

The well flowed through 2-in. tubing, making 10,000 M.c.f. of gas per day from the Misener at 5,607-10 ft.

ROCKY MOUNTAINS

WYOMING

Completion Under Way At Sheridan Wildcat

Trigood Oil Co. is completing its 1 Ingram-A in N½ NE SE 9-54n-77w, Sheridan County. The company reportedly is attempting completion after setting production string to total depth of 10,531 ft. The Minnelusa has been perforated.

A recovery of 4,600 ft. of free oil from two zones in the Minnelusa was reported. This has not been confirmed. Unofficial reports state the top of the Minnelusa is at 10,383 ft.

Location of this Sheridan County rank test is in the Arvada area. Nearest drilling is 5 miles northwest. Closest production is 22 miles east at Hay Creek field.

Mesaverde Gas Shows Reported at Wamsutter Unit

Cores showed gas in the Mesaverde at the important wildcat in the Wamsutter Unit, C SE 12-20n-95w, Sweetwater County. The well is Ohio Oil Co.'s test. Coring is now at 9,628-87 ft. Recovery of the shows was at 9,600-26 ft.

Gas Flows at Chimney Butte Wildcat

The second deep try on the Chimney Butte deep unit in Sublette County, Green River basin, flowed 1,715 M.c.f. of gas per day. It is Belco Petro'eum Co.'s 2 Unit, NW SE NW 35-28n-113w. Perforations at 6,896-6,930 ft. Tops are Mesaverde at 3,246 ft., first Frontier at 6,901 ft.,

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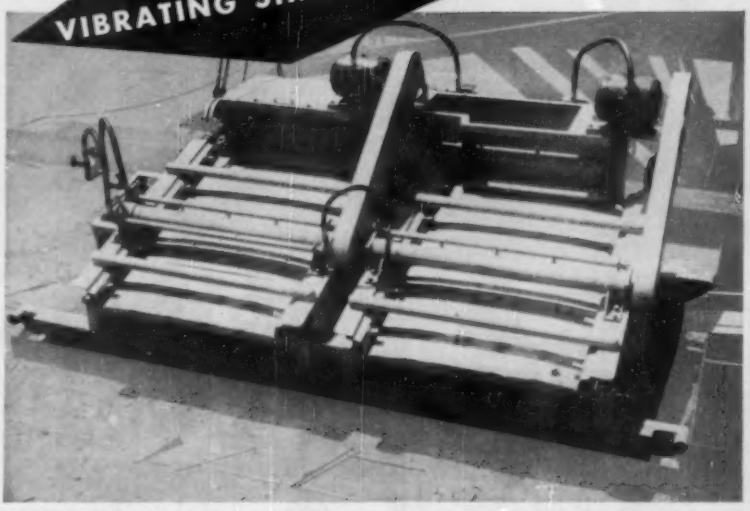
VIBRATING SHALE SHAKER



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second Frontier at 7,293 ft., and third Frontier at 7,774 ft.

This discovery is about 5 miles southeast of the discovery well, 1 Unit, in NE SW SE 4-28n-113w. That well was completed several months ago flowing 1,533 M.c.f. per day from Frontier perforations.

COLORADO

North Park Basin Discovery Finaled

A new pay has been opened in northern Colorado's Nork Park basin. The discovery well is Continental Oil Co.'s Jackson County wildcat, the 1 Sherman-B in NE NW SE 13-9n-79w.

The company completed the Muddy discovery for 47 bbl. of oil per day on pump through perforations at 6,184-6,214 ft. The well is on the southwest of North McCallum field. This is the first Muddy production in this area which previously had Dakota and Morrison production. The Dakota is Cretaceous and Morrison is Jurassic in age.

Wildcat Program Slated For Las Animas Area

Jett Petroleum Co. will drill 11 wildcats in southeastern Colorado counties: Pueblo, Baca, Otero, Kiowa, Bent, and Powers.

Three wildcats will go down in Prowers County in 23s-42w, 23s-43w, and 21s-47w. In Pueblo County a well will be drilled in 24s-60w; 34s-49w, and 32s-47w, Baca County; 19s-51w and 19s-53w, Kiowa County, and 22s-51w and 23s-48w, Bent County.

The wildcats reportedly will test Mississippian rocks. This is the first general drilling program for this far northwestern sector of the Anadarko basin in many months.

MONTANA

Important Outlook Well Flows Silurian Oil

Amerada Petroleum Corp. moved Outlook area production in Sheridan County to its westernmost point at 1 Thorson, SW SE 21-36n-52e. The well flowed oil at the hourly rate of 14 bbl. on drill-stem test of the Outlook pay at 8,855-8,904 ft.

This indicated discovery is more than 2 miles from Outlook area production, making the field area about 5 miles long, east-west.

Another well in the area, the 1 Wexels, NE NE 23-36n-52e, also is an indicated producer. Amerada is swabbing perforations at 8,990-9,030 ft. at this well. A drill-stem test at 9,090-9,105 ft. in Outlook pay recovered 900 ft. of oil. Location is 1 mile west of Outlook field itself.

Carter Quits at Sheridan County Well

Carter Oil Co. has called its 1 Nelson in S½ NE NW 4-37n-53e, close to the Canadian border in Sheridan County, a dry hole. Total depth of this well is 10,215 ft. The well is north of the general Outlook area and has been closely watched during drilling progress.

NORTHWEST NEW MEXICO

Paradox Well Reported In-Old Hogback Field

Pan American Petroleum Corp. found Paradox-Pennsylvanian oil at its Hogback field Mississippian test in San Juan County. The well flowed 14 bbl. of oil per hour on drill-stem test at 6,520-6,670 ft.

Confirmation Wells in Powder River Completed

Two important confirmation wells were completed in the Powder River basin of northeastern Wyoming.

Midwest Oil Co. 36-1 State, C NE

"Stop mumbling, Murchison, and speak up—did you run into trouble on that job?"

ALL-NEW D&S TRI-DIA BIT!

faster penetration, more rig savings

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Reduced O D wall contact approaches that of Tri-Cone Rock Bit.

Eliminates swabbing, hydraulic action when making trip.

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Known the world over for smooth, reliable service, Brewster Rotaries are the first choice of drillers — everywhere.

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Shreveport, Louisiana

BREWSTER

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1 **FLUSH DECK**— Free of projections and diamond treaded to afford safe footing for crew.

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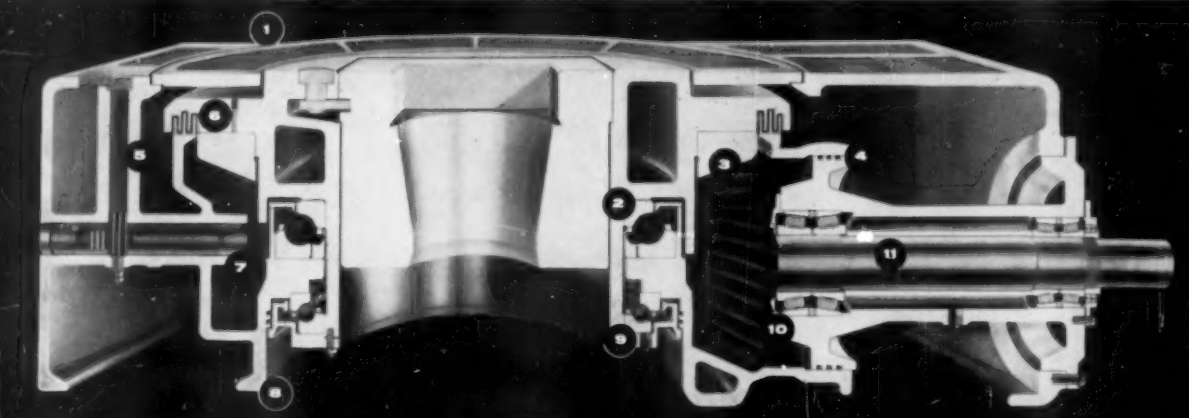
3 **RING GEAR AND PINION**— Spiral bevel gears, machined from heat-treated alloy steel. Oil lubricated from own separate reservoir.

4 **OIL SEALS** — Triple "O" ring seals keep dirt and foreign matter out of gear compartment.

5 **TABLE LOCK** — Easily accessible for rapid operation. Flush with table top for working safety.

6 **MUD SEAL**— Triple groove labyrinth seals gear compartment from drilling mud. Has no friction fit parts to wear out.



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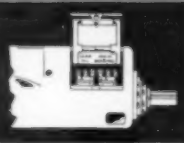

LUBRIPORT— An exclusive Brewster development shields and protects all lubricating fittings and oil plugs. From this one point on a Brewster table every part may be individually lubricated. Separate oil reservoirs for main bearings and for ring gear and pinion prevents contamination of bearings from metal particles produced by gear wear. Grease lubrication of pinion and hold-down bearings provides instant lubrication regardless of how cold temperatures are when table is started up.

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22" MODEL RSH-22
Center distances 53¼"

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in long and short types.

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Howard Supply Company • Apex Equipment Company • Bovaird Supply Company • Industrial Supply Company • Murray Brooks, Inc. • United Supply and Manufacturing Company • Export Sales: The Brewster Company • (HOMCO) Houston Oil Field Material Company, New York, N. Y., Houston, Texas; Mexico City, D. F.

NE 36-49n-69w, Campbell County, flowed 65 bbl. of oil daily on 32/64-in. choke from Newcastle perforations at 6,440-50 ft. The discovery well is the 1 Krouse in C SW SE 25-49n-69w. It flowed 4 bbl. hourly for 14 hours from perforations at 6,476-92 ft.

True Oil Co. completed its A-7 Burrows in C NE NE 19-49n-68w, Crook County. This pumper made 88 bbl. daily. It is a Dakota producer at 6,635-37 ft., and is the confirmation to 2 Koch, a 50-bbl. per hour well. This new field is 1 mile south of Donkey Creek field, separated by a dry hole.

Fremont County Gas Discovery Finaled

Sinclair Oil & Gas Co. completed its Fremont discovery, the 1 Federal-Travis, NE NE SW 13-34n-91w. The shut in gas well flowed gas on drill-stem tests at daily rates of up to 3,100 M.c.f. No gage on completion has been reported yet, nor the pay sand. This is the second well by Sinclair on the Castle Garden plot.

UTAH

Aneth Area Adds Six New Producers

The fast-moving development program in San Juan County's Aneth area continues. Six new wells were added to the field last week.

The Texas Co. completed four wells in Aneth field. The 5 Navajo-F, NE NW SW 30-40s-25e, flowed 1,656 bbl. of oil per day on 1-in. choke. The 12 Navajo-C, W½ NW SW 23-40s-24e, flowed at the rate of 1,116 bbl. per day on 1-in. choke. The 9 Navajo-G, NW NW NW 17-40s-24e, made 1,128 bbl. per day on 1-in. choke. The 9 Navajo-E, C NW NE 15-40s-24e, made only 83 bbl. of oil and 41 bbl. of water daily through open tubing.

At White Mesa field, Davis Oil Co. 2 Navajo-A, C NE NW 27-41s-24e, flowed 73 bbl. of oil per hour on ¾-in. choke. This was 4-hour gage test. Continental Oil Co. completed 4 Navajo in Cahone Mesa field, NW NE NE 28-40s-25e, for 160 bbl. of oil per day, on pump.

NORTH DAKOTA

New Pay Strike Hinted At Dickinson Field

New Dickinson field in southwestern North Dakota has a new-pay discovery in prospect. The well is Atlantic Refining Co. 1 Kadrmas in C NE SE 31-140n-96w, Stark County. Recovery of 3,080 ft. of oil on a Fryburg-Heath test was reported at 7,783-7,837 ft.

This new-pay strike is an 80-acre offset to the discovery well of the field which is a Madison-Mississippian producer. Location is 2 miles northwest of the town of Dickinson, and 21 miles northeast of Fryburg field. This section of the state is expected to bring forth some important exploratory news in the coming months due to the increased drilling interest in this section following the Scoria Unit and Rocky Ridge discoveries this year.

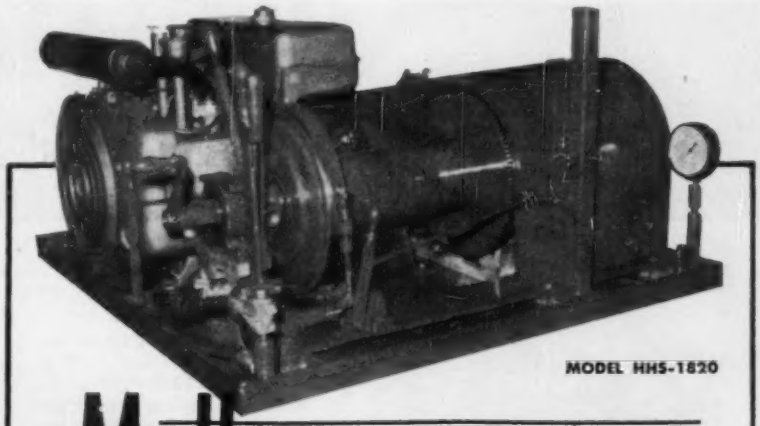
TEXAS

NORTH TEXAS

Sunray Mid-Continent Plans Drilling Play

Sunray Mid-Continent Oil Co. has completed four successful gas wells recently in the Boonsville gas field of Wise and Jack counties. The operator also has three strings of tools working in the two-county area on a gas well program which calls for the drilling of 20 separate wells in the Bend conglomerate zone.

Sunray has a total of 5,490 acres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in this two-county gas area. Of the acreage dedicated under the 20-well contract, 4,817 acres are proven. A 320-acre spacing regulation prevails in the field.

Gassers completed in the field to date, all in the Bend conglomerate zone in the Boonesville field, and all in Wise County, Texas, include:

No. 1 M. E. Pruett made open flow potential of 23,000 M.c.f. of gas a day through perforations from 5,197-5,200 and 5,689-99 ft. Total depth was 6,030 ft. This well is located on the Mayme Harper fee land, T. Denson Survey, A-239.

No. 1 J. W. Cole had an open flow potential of 17,750 M.c.f. of gas a day through perforations at 5,614-32 and 5,395-5,401 ft. Total depth was 6,083 ft. The well is located on the J. W. Cole fee land, W. Burke Survey, A-39.

No. 1 A. M. Miller had an open-flow potential of 7,900 M.c.f. of gas a day through perforations at intervals from 5,409-6,013 ft. Total depth was 6,182 ft. The well is located in the Miller lease, Samuel Issacs Survey, A-454.

No. 1 Payne had an open flow potential of 2,000 M.c.f. of gas a day from the Bend conglomerate zone at 5,146-5,506 ft. Location is in the Hadley Survey, Abstract 372.

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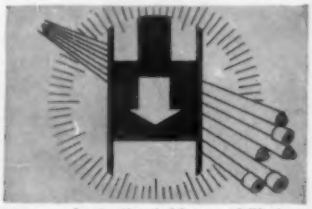
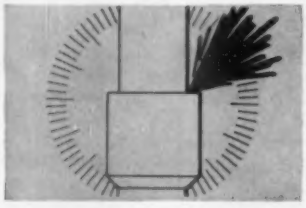


for testing tubing or drill pipe.



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CALIFORNIA

Los Angeles County: H. C. Morton and H. S. Kolbush 1 Engman, NE SW 14-5n-18w, 134 bbl. daily gross, 30 bbl. daily net, 29.4° gravity, perforated in 10 small intervals between 365-900 ft. TD 2,771 ft. (Faulted anticline top new field discovery in Piru Canyon area.)

LOUISIANA OFFSHORE

Vermilion Parish: Union Oil Co. of California 3-A OCS-0560, Block 67, Vermilion area, Gulf of Mexico. IP 5,500 M.c.f. daily, ¼-in., 4,000 psi., perforations 10,410-30 ft., and (dual completion) 3,000 M.c.f. daily, ¼-in., 2,800 psi., perforations 8,027-38 ft. TD 10,700 ft. (New pays in Vermilion Block 67 field.)

TEXAS GULF COAST

Bee County: Coastal States Gas Production Co. 1 Heldenfels, Bee County School Land Sur., A-96. Shut-in gas well, no gage, perforations 4,164-67 ft. (Vicksburg). TD 4,253 ft. (Second well and new pay in unnamed new field 3½ miles northwest of Yougeen field.)

Plymouth Oil Co. 1 O'Neill, George O'Docharty Sur., A-49 (½ mile northeast of Yougeen). IP 28,000 M.c.f. daily, absolute open-flow potential, dry gas, perforations 4,480-84 ft. (Vicksburg). TD 4,558 ft. (New field.)

Calhoun County: Arkansas Fuel Oil Corp., C. G. Glasscock and Tidelands Oil Co. 3 State Tract 66, Guadalupe Bay (3½ miles southwest of Seadrift). IP 209 BOPD, 11/64-in., 48.2°, GOR 1,400 cu. ft. per barrel, TP 780 psi., perforations 7,818-25 ft. (Frio), and (dual completion) 196 BOPD, 5/32-in., 46.5°, GOR 1,250 cu. ft. per barrel, TP 575 psi., perforations 7,924-31 ft. (Frio). TD 8,008 ft. (New pays in North San Antonio Bay field.)

Hardin County: Ada Oil Co. 2 Sternenberg, John A. Vickers Sur., A-52. IP 46.79 BOPD, ⅛-in., GOR 200 cu. ft. per barrel, TP 250 psi., perforations 6,392-96 ft. (Cockfield). TD 7,753 ft. (New pay in Vickers field.)

Harris County: R. D. Simonton 1 Bender Estate, Wherry B. Adams Sur., A-95. IP 184.32 BOPD, 5/32-in., GOR 450 cu. ft. per barrel, TP 660 psi., perforations 4,916½-29½ ft. (Yegua). TD 5,542 ft. (New pay on northwest flank of Humble dome.)

Jefferson County: Lawrence J. Kelly 1 Frank Carpenter et al, Section 92, John L. Patrick Sur., A-848 (2 miles north of Nome). IPP 41.85 BOPD, 27.1°, perforations 5,550-52 ft. (Marginulina). TD 8,515 ft. (New field—North Nome.)

Liberty County: Beck Oil Co. 1 Liberty Independent School District, Lot 4, Block 14, Liberty Town Tract, A-359. IP 5,600 M.c.f. daily, absolute open-flow potential, GLR 45 M.c.f. per barrel, 58°, shut-in pressure 4,266 psi., perfs. 11,588-94 ft. (Cook Mountain). TD 11,721 ft. (New pay on north flank of South Liberty dome.)

San Patricio County: Skelly Oil Co. 2 Tutt, Section 59, George H. Paul Subd., Coleman-Fulton Pasture Co. Lands (3½ miles southwest of Taft). IP 27,000 M.c.f. daily, absolute open-flow potential, dry gas, shut-in pressure 1,541 psi., perforations 4,018-26 ft. (Catahoula). TD 4,113 ft. (New pay in South Taft field.)

Spahr Young but Experienced

FEW EXECUTIVES have risen so quickly to prominence in the oil industry as the new president of Standard Oil Co. (Ohio).

Young, energetic Charles E. Spahr is only 44, but he's had a wealth of experience in oil transportation.

He's a civil engineer who's spent most of his adult life in pipelining—even during his war service. And he's a man whose hobbies center around the home, provided he can get away now and then for a litt'e cane-pole, meditative fishing.

In the job he's just taken over from Clyde T. Foster, who continues as board chairman and chief executive, Spahr will be deeply involved in refining, production, petrochemistry, and marketing, as well as pipelining.

CHARLES E. SPAHR
... Sohio pipeliner succeeds Foster.

Pipeline career . . . Spahr entered the oil industry in 1934, when he graduated from the University of Kansas and went to work at the Sugar Creek, Mo., refinery of Standard Oil Co. (Ind.).

The following year he moved to Phillips Petroleum Co. and became assistant to the vice president of the engineering department. His work was primarily in economic studies of new pipeline projects.

In 1939 he left Phillips to join Ohio Standard, and he has been with that company ever since.

His 4 years of military duty during World War II proved to be an asset. As a major with the U. S. Army Corps of Engineers he supervised construction of the 570-mile Chittagong Tinsukia section of the India-Burma-China emergency fuel pipeline, built to supply gasoline for long-range bombers.

Back with Ohio Standard after the war, he held various supervisory jobs in the transportation department before his promotion as vice president of transportation in 1951. Later he was named assistant to the president, and in 1955, executive vice president, the position he held until his recent appointment as president.

Spahr has been active in industry, civic, and government affairs. He's a vice president and director of the American Petroleum Institute, a director of the Ohio Chamber of Commerce, a trustee of Lutheran Hospital and the Cleveland Development Foundation, and he served for a year as director of the supply and transportation division of the Petroleum Administration for Defense. He's now a member of the Military Petroleum Advisory Board.

Family man . . . With all these activities, it would seem unlikely he would have much leisure. But he tries to spend most of his free time at home. "My main hobby," he says, "is my family."

While he spends much of his spare time playing with the children, digging in his flower garden, playing golf, and working in his woodwork shop, not all his activities are so vigorous.

"I like to fish in true lazy style with a straw hat pulled down over my face and a pole with static line hanging in the water," he says. But he jokingly adds that he sometimes purposely fails to bait the hook, "so I won't be disturbed."

The future . . . As president of Ohio Standard, Spahr takes on more responsibilities.

The company operates about 2,280 miles of crude lines and 110 miles of products lines, and is also joint owner of the 1,000-mile Mid-Valley crude line connecting Lima, Ohio, with Longview, Tex.

Through its producing subsidiary, Sohio Petroleum Co., the firm has production in most of the major producing areas of the U. S., and in Canada and Venezuela.

Four refineries, with combined capacity of 138,000 bbl. daily, are operated in Toledo, Cleveland, and Lima, Ohio, and Latonia, Ky.

The year 1958 will see the completion of at least two big refining projects. A new 60,000-bbl. plant will replace most of the present units at the 23,000-bbl. Toledo refinery. The new plant will cost about $40,000,000.

And at the 52,000-bbl. Cleveland refinery, the company is installing a new $3,800,000 alkylation unit which will produce up to 3,570 bbl. a day of 100-plus-octane gasoline components.

Personals

John Shelton, Houston, and **Jack Warne,** Denver, have been transferred to Shell Oil Co.'s Billings, Mont., office as geologists.

R. G. Reese, chief geologist for Hudson's Bay Oil & Gas Co., Ltd., has been named manager of Canadian interests of Kern County Land Co. Kern County Land recently announced a joint Canadian exploration program with Home Oil Co., Ltd. Kern County Land will hold a 25 per cent interest. **E. H. Vallatt** will serve as the company's consultant in Canada.

Dr. B. D. Thomas, director of Battelle Memorial Institute, has been named president. He succeeds **Dr. Clyde Williams,** who has retired. Thomas joined Battelle in 1934. He was appointed assistant director in 1942 and vice president in 1955.

C. E. Harrison, geologist at Midland, Tex., has been promoted to division geologist for Continental Oil Co. in Wichita Falls, Tex. Harrison succeeds **R. F. Mathews,** who recently transferred to Conoco's Roswell, N. M. exploration office. Harrison joined Continental in 1953.

Bill Tindell, Mayfair Minerals, Inc., has been elected president of Abilene, Tex., Geological Society. Other 1958 officers are **Louis A. Williams,** Sun Oil Co., vice president; **Dorman N. Farmer,** Wayne Petroleum Co., treasurer; and **Earl Chisholm,** Kewanee Oil Co., secretary.

Russell Hensch has been named northern division superintendent in Dallas for Standard Oil Co. of Texas. He was formerly division geologist. **James G. Joyce** has been appointed San Antonio district geologist for the company.

Personals

Philip L. Dana has been elected vice president and head of the oil and gas division of J. M. Huber Corp. He was formerly chief geologist and assistant to the vice president, oil and gas division. Dana has been with the company since 1944. He succeeds the late C. Earl Blackburn.

W. C. Atherton, H. C. Ball, C. A. Deveny, Jr., and **C. B. Fletcher** have been named senior mechanical engineers in the engineering division at Humble Oil & Refining Co.'s Baytown, Tex., refinery.

Paul Ravesies, petroleum engineer for Seaboard Oil Co., has been transferred from the company's Dallas headquarters to Caracas, Venezuela, to head up a new office there. Transferred with him were **D. E. Hibbard** and **T. A. Edwards,** geologists.

Jeff J. Shipps, formerly with Shell Oil Co. in Houston, has joined **Richard F. Svoboda,** Lincoln, Neb., consulting geologist, as a partner. A graduate of the University of Nebraska and University of Houston, Shipps had been with Shell for 9 years as geophysicist and geologist.

W. A. Rogers, Humble Oil & Refining Co., Pampa, Tex., has been named chairman of the Panhandle chapter, American Petroleum Institute, Division of Production. Other 1958 officers of the chapter are **Frank Storm,** Storm, Hermann & Hagy, first vice chairman; **M. G. Rogers,** Pan American Petroleum Corp., second vice chairman; **Max Bolick,** Cities Service Oil Co., third vice chairman; and **Martin Ludeman,** West Pampa Repressuring Project, secretary-treasurer.

Samuel F. Bowlby, vice president and senior representative on the West Coast for Shell Oil Co., has been reelected president of Western Oil and Gas Association. All other officers also were reelected. They include **Olen Lane,** vice president, Continental Oil Co., first vice president; **D. T. Staples,** president, Tidewater Oil Co., second vice president; and **T. H. Wallace,** vice president, Western Gulf Oil Co., treasurer; **Felix Chappellet** has been reelected secretary, vice president, and general manager of the association.

Marvin C. Rushing has been transferred by Humble Oil & Refining Co. from Corpus Christi, Tex., to Anchorage, Alaska, as geologist.

W. G. (Bill) Harris, Jr., geological consultant in Carmi, Ill., has joined Farrar Drilling Co. in Mount Vernon, Ill., as geologist and partner.

Bob Atchison has been transferred to Belfry, Mont., from Powell, Wyo., by British - American Oil Producing Co.

Ivan Opperman, formerly with Robinson-Puckett, Inc., in Abilene, Tex., has been appointed drilling superintendent for Lomac Drilling Co. in the company's Abilene office. **Jack F. Grimm,** independent geologist and producer, is also with Lomac in its new Abilene offices.

Edward J. Coel, senior petro'eum engineer for El Paso Natural Gas Co. in Farmington, N. M., has been transferred to El Paso, Tex., as supervising petroleum engineer. El Paso has also promoted four men to chief operator. They are **George Winkley,** Jal, N. M., plant 4; **Calvin R. Luther,** Laguna station, San Juan division; **D. C. Beevers,** Lindrith station, San Juan division; and **Arthur C. Karger,** Roswell, N. M., station.

Maurice A. Finney, superintendent of Pure Oil Co.'s Texas production division at Fort Worth, has been named general manager of operations of Pure Oil Co. of Paraguay, Inc., at Asuncion. Replacing him as Texas producing division superintendent of the company will be **W. F. Schafer,** superintendent of the West Texas district at Midland since 1949. **Hugh L. Teague,** superintendent of Pure's northwest district, which includes New Mexico and a part of West Texas, will transfer from Dollarhide field to Hobbs, N. M.

K. E. Tappy, superintendent of Ohio Oil Co.'s Casper, Wyo., pipeline division, has been named superintendent of the Martinsville, Ill., pipeline division. **M. L. Stanfield,** assistant superintendent at Casper, moves up to succeed Tappy there. **M. E. Parker,** acting division superintendent at Martinsville, transfers to Casper to succeed Stanfield as assistant superintendent there. Tappy has been with Ohio Oil since 1933. He was pipeline division superintendent in Lima, Ohio, before being named superintendent at Casper in 1956. Stanfield has been with the company since 1937, Parker, since 1932.

F. H. Latimer, assistant manager of Sun Oil Co.'s Michigan division, has been appointed manager of the company's new eastern production division. **E. J. Reading,** central production division manager, will be assistant manager of the new division. The new division will be headquartered at Evansville, Ind. It is the result of consolidation of the central and Michigan production divisions. The merger takes effect May 1, 1958.

F. H. LATIMER

E. J. READING

George W. Myers, manager of the Michigan production division, will retire July 1. Latimer joined Sun in 1938 as a geologist at Evansville. He had been assistant manager in Michigan since 1954. Reading became manager of the central production division in 1953. He joined Sun in 1935. Myers, retiring Michigan division manager, has been with the company for 11 years. He had held his present position since 1954.

J. C. Benedict, assistant vice president and exploration manager of Oil Trading Associates, Inc., New York, has resigned to form Benedict Oil Associates, Wichita. The exploration company will operate in Kansas, northern Oklahoma, and the Denver basin.

A. Neil Lilley, vice president and director of The Texas Co., has been elected president of McColl-Frontenac Oil Co., Ltd. He succeeds **T. C. Twyman,** who will become senior vice president of Texaco January 1. Twyman will be in charge of Texaco's world-wide sales program. **Harvey Cash,** assistant to the board chairman of Texaco, will succeed Lilley as vice president in charge of foreign operations, Eastern Hemisphere. Twyman joined Texaco in 1930. He joined McColl-Frontenac, an affiliate, in 1942 and has been president and chief executive officer since 1952. Lilley had been vice president of Texaco since 1951 and a director since 1954. Cash was general manager of Texaco's foreign operations department, Eastern Hemisphere before being named assistant to the board chairman last year.

Lawson S. Fuller has been transferred from El Paso Natural Gas Co.'s Salt Lake City drilling department to company headquarters in El Paso as drilling superintendent. He will supervise all company drilling activities. Fuller joined El Paso's San Juan division in 1950.

Ann Stanley, geologist for Atlantic Refining Co., has been transferred to Dallas from Casper, Wyo.

Donald C. Kilby has joined The Texas Co. in Port Arthur, Tex., as a chemist.

B. R. Griffith, coastal division petroleum engineer for Union Oil Co., has retired. He had been with Union since 1925.

Sam T. Boltz, Jr., production foreman for The Texas Co., has been transferred to Meeker, Colo., from Hamilton, Colo.

Lowell H. Below has been transferred by Continental Oil Co. from Houston, where he was assistant to the senior vice president, to Ponca City, Okla., where he will be general foreman of the lube-oil division.

John A. Cochran, manager of Lone Star Producing Co.'s South Texas exploration district, will head up a new West Central Texas district exploration office at Abilene for the company. Also transferring to Abilene will be **Harold C. Beaird,** district geologist; **B. C. Holt,** geologist; and **Clarence O. Houts,** district landman.

John F. Partridge, Jr., Casper, Wyo., consulting geologist, is new president of the Rocky Mountain section, American Association of Petroleum Geologists. His appointment follows the resignation of **R. W. Mellory,** who moved to Calgary to become Canadian exploration manager for Champlin Oil & Refining Co.

Guillermo Rodriguez, president of Puerto Rico Government Development Bank since 1953, has been named president and a director of Caribbean Refining Co. He will succeed **Edwin Singer** January 1. Singer becomes chairman of the board. **Walter Nelson,** plant manager, has been named vice president of Caribbean and **Gene Case,** operating superintendent, has been elected vice president, manufacturing.

Victor H. Zoller, vice president for exploration, White Eagle Oil Co., has been transferred to Midland, Tex., from the company's Tulsa headquarters. The move will switch headquarters for exploration to Midland.

Jackie Rea, formerly with Stroube Central Co., Abilene, Tex., has joined Jocelyn-Varn Oil Co., Wichita, as head of the company's new Abilene, Tex., office. **W. T. Munn,** geologist with Murray Petroleum in San Angelo, Tex., has also joined the company in Abilene.

H. W. H. Meyer and **P. S. Viles** have been promoted to senior research chemists in the research and development division at Humble Oil & Refining Co.'s Baytown, Tex., refinery. Meyer is a graduate of the University of Texas and Viles of Texas Technological College.

H. F. Dangberg has been elected manager of the production department and a director of Hancock Oil Co. Dangberg succeeds **P. T. Martin** as production manager. Martin will continue as a director and will be responsible for over-all exploration and production activities.

V. N. Harbinson, Toronto, has been named president of Share Oil Co. **R. M. Diamond,** Calgary, has been named vice president, and **H. Wilton-Clark,** Calgary, is secretary. Election of the new officers follows purchase of control of Share by Norsyncomaque Mining, Ltd., Toronto.

F. L. Carpenter has been promoted by Gulf Oil Corp. from district production manager in Evansville, Ind., to Houston division petroleum engineer. Carpenter succeeds **H. B. Leeton,** who was recently appointed division production manager, Western Gulf Oil Co. A graduate of Missouri School of Mines, Carpenter joined Gulf in 1938. **W. C. Best** transfers from Pittsburgh to succeed Carpenter as district production manager in Evansville.

Andrew G. Alpha, Signal Oil & Gas Co., has been elected 1958 president of Rocky Mountain Association of Geologists. Other officers include **Daniel S. Turner,** Dan Turner & Associates, first vice president; **H. H. R. Sharkey,** Carter Oil Co., second vice president; **Joseph B. (Bill) Headley,** Southwood Exploration Co., Inc., secretary-treasurer; and **F. A. (Gus) Thurman,** Thurman Consultants, and **William A. Newton,** consultant, councillors.

Personals

Robert L. Zieve has been transferred by Pan American Petroleum Corp. from Billings, Mont., where he was geophysicist, to Bismarck, N. D., as staff geophysicist.

Lon D. Hudspeth, trainee production engineer with Phillips Petroleum Co., has been transferred to Eureka, Kans., from Odessa, Tex., and put on permanent assignment as production engineer.

DEATHS

Tom C. Hefner, retired production foreman for Pan American Petroleum Corp., died December 16 in Okemah, Okla. Hefner was with Pan American 35 years before retiring last year. He was 66.

M. J. Grove, Wichita Falls, Tex., independent operator, died recently in Wichita Falls.

Leo M. Conley, 77, who retired from Sinclair Oil & Gas Co.'s Argentine, Kans., refinery in 1941, died December 21 in Tulsa. Conley entered the oil business with Buckeye Pipeline Co. He was later with Gulf Oil Corp., White Oak Refining Co., and Sinclair.

Hobart Cockburn, 59, Powell, Wyo., oil driller, died recently of a heart attack. He had operated a drilling company in Wyoming and Montana.

Charles H. Kelson, 84, retired oil man and one-time Montana and Minnesota state legislator, died recently at Shelby, Mont. He was manager of Tom Davis Syndicate Oil Producers at Sunburst, Mont., from 1928 until he retired several years ago.

John Carroll Hamilton, 66, president of Arkansas Louisiana Gas Co., died December 19 in Kansas City. He had been in a hospital there since undergoing a stomach operation in November. Hamilton had been with the company and its predecessors since 1919. He was named vice president in 1946, senior vice president in 1955, and president later the same year.

Roscoe C. Taylor, 72, owner of Taylor Oil Co., Castle, Okla., died December 25 in Tulsa.

Arch Edward Erickson, 72, retired Interstate Pipe Line Co. superintendent, died December 25 in Tulsa.

Latest Figures . . . Industry Trends

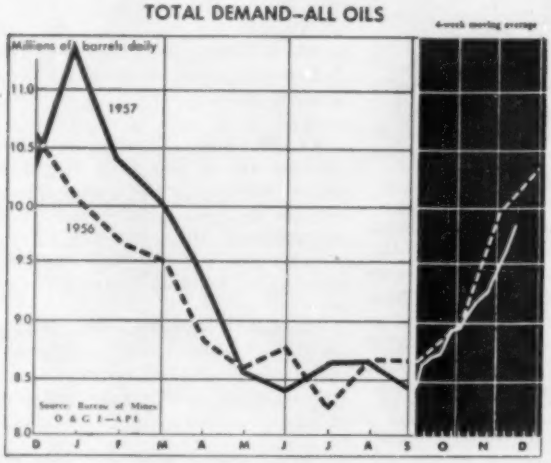
A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	9,889,900	UP	23,150	DOWN	489,198
Crude stocks	279,210,000	DOWN	541,000	UP	5,503,000
Completions	1,127	UP	222	UP	56
Refinery runs*	7,774,000	DOWN	33,000	DOWN	226,000
Gasoline stocks*	188,845,000	UP	758,000	UP	11,808,000
Kerosine stocks*	29,904,000	DOWN	1,379,000	DOWN	2,514,000
Distillate stocks*	159,275,000	DOWN	3,870,000	UP	19,665,000
Residual stocks*	59,034,000	UP	195,000	UP	15,889,000
Four-product stocks*	437,058,000	DOWN	4,296,000	UP	44,848,000
Total imports*	1,359,700	DOWN	203,500	UP	133,200

*For week ended December 13.

ALL TABLES AND CHARTS, BASED ON API REPORTS, ARE FOR WEEK ENDED DECEMBER 13 SINCE THE API REPORT FOR DECEMBER 20 WAS DELAYED BECAUSE OF CHRISTMAS HOLIDAYS

TOTAL DEMAND—ALL OILS



Surplus Refined Products Create Soft Product Market in 1957

CRUDE AND PETROLEUM-PRODUCT markets for 1957 were influenced by a supply condition that could be described as "too much, too late."

Increased demand for crude and fuel oils, following the closing of the Suez Canal about the end of the third quarter in 1956, called for higher production and refinery runs. The picture of what happened is shown on the crude-production chart on page 312.

Note that production was at a low point in October. Gains over this low level amounted to about 400,000 bbl. daily by December. Increases continued through March which was the end of the normal heating season.

Since production reached the high level so late in the heating demand season, there was plenty of crude to meet the abnormal export demand. But, the Suez Canal opened. Production rates were lowered, but not fast enough. Production remained above the previous-year rate until the end of June.

By that time, crude stocks had climbed to 284,000,000 bbl. The oil industry spent the remaining months of the year trying to balance supply with demand. This struggle influenced crude and product prices.

Crude prices advanced $0.25 a barrel for most areas early in January. Heavy export demands at Gulf Coast ports placed a premium on crudes near shipping points. The result was a premium for these crudes on the new price schedules. Some grades were raised $0.35 a barrel and others $0.45 a barrel, compared with the boost of $0.25 a barrel for inland crudes.

Some of these crudes lost their location advantage as soon as the Suez crisis was over. The last half of the year was a general period of adjustment for crude prices. The general surplus of material created some severe competition for crude markets.

Despite cuts in production allowables in the last half, crude stocks were still hanging around the 280,000,000-bbl. mark in December. The crude-stock total would have been higher if refinery runs had been held in line with demand. Excessive refinery runs in the second quarter of the year pushed product stocks to a peak of 50,000,000 bbl. above the year before. Even with reduced runs in the third quarter, product stocks were 43,000,000 bbl. above the 1956 level at the end of September.

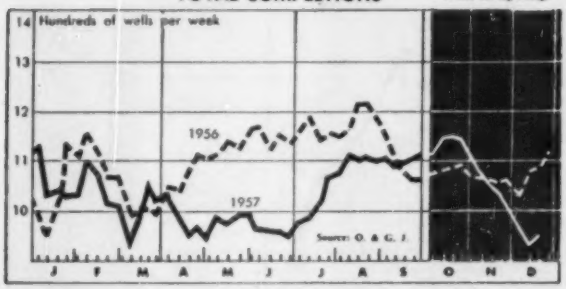
The delay in bringing refinery runs in line with lagging demand put a lot of pressure on product prices. Following the crude-price increase in January, product prices moved up, but the raises were influenced by demand.

During the last half of 1956, Group 3 gasoline prices had dropped from 11.50 cents a gallon to 10.75 cents at the end of the year. Following the crude-price change, Group 3 gasoline moved up to 12.00 cents or only half a cent over quotations for the previous summer. But, even this price didn't hold. Prices dropped in April and May. The octane number for gasoline was raised from 88 to 89 in May and the price moved back up for a while. Pipeline-grade material was available at 11.25 cents throughout most of July and August.

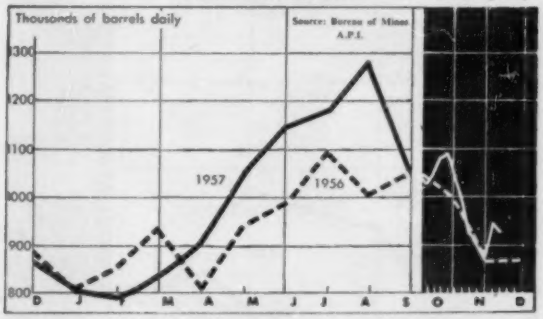
The Group 3 gasoline market strengthened some in the fall but ended the year with a shaky market at 11.25 cents for spot sales to good jobbers.

Gasoline prices on the Gulf Coast showed a greater drop. Regular gasoline at the end of the year was selling for at least half a cent less than at the start, despite the crude-price increase in January. No. 2 distillate was off half a cent and kerosine a full cent compared with prices at the first of the year.

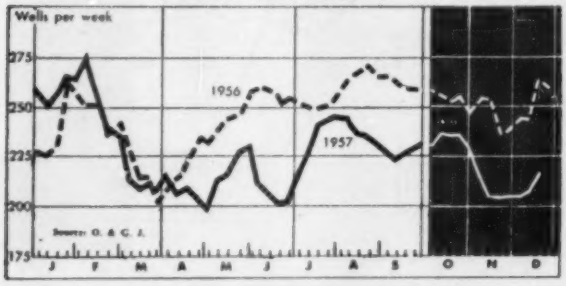
TOTAL COMPLETIONS



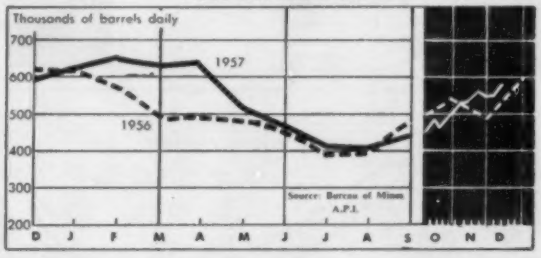
CRUDE IMPORTS



WILDCAT COMPLETIONS



PRODUCT IMPORTS

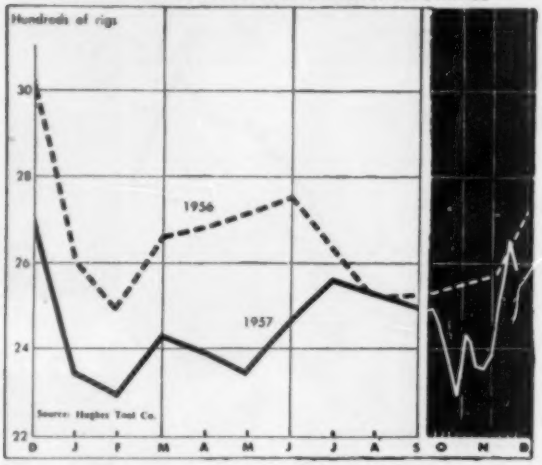


WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 21, 1957

	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1957	1956	Total	Crude	Cond.	Gas	Dry	1957	1956
Alabama	2	0	0	0	2	0	20,860	77	‡107	2	0	0	0	2	28	‡50
Arkansas	17	7	0	1	9	0	51,866	1,076	970	6	0	0	0	6	204	181
California	61	42	0	3	16	0	258,680	2,207	2,203	11	1	0	0	10	518	506
Colorado	17	3	0	3	11	0	85,916	838	1,196	9	1	0	0	8	539	661
Illinois	59	22	0	0	37	0	139,307	2,643	3,738	12	2	0	0	10	620	754
Indiana	65	19	0	2	44	0	120,192	718	719	23	0	0	0	23	146	143
Kansas	94	49	0	10	33	2	326,146	4,119	4,840	14	3	0	0	11	807	1,054
Kentucky	4	1	0	3	0	0	11,389	1,448	1,890	0	0	0	0	0	300	432
Louisiana	90	33	5	7	45	0	716,710	3,776	3,747	14	1	0	1	12	663	759
North	34	10	0	3	21	0	122,001	1,408	1,661	7	1	0	0	6	202	259
South	42	15	5	3	19	0	461,377	1,705	1,674	5	0	0	0	5	371	423
Offshore	14	8	0	1	5	0	133,332	663	412	2	0	0	1	1	90	77
Michigan	13	8	0	0	5	0	35,160	436	434	3	1	0	0	2	149	167
Mississippi	14	4	0	0	10	0	101,701	384	427	6	0	0	0	6	195	210
Montana	7	3	0	0	4	0	25,345	426	484	4	0	0	0	4	181	189
Nebraska	16	5	0	0	11	0	93,868	868	899	7	1	0	0	6	470	443
New Mexico	43	25	0	6	12	0	208,393	2,079	1,887	7	0	0	0	7	263	277
Northwest	21	10	0	6	5	0	101,707	891	847	3	0	0	0	3	100	106
Southeast	22	15	0	0	7	0	106,686	1,188	1,040	4	0	0	0	4	163	171
New York	9	4	0	0	0	5	9,250	458	....	0	0	0	0	0	11	....
North Dakota	21	10	0	0	11	0	152,869	306	260	14	3	0	0	11	143	78
Ohio	6	3	0	0	3	0	15,458	1,093	1,073	0	0	0	0	0	18	13
Oklahoma	129	61	3	14	47	4	464,975	6,111	7,925	17	1	1	1	14	730	846
Pennsylvania	0	0	0	0	0	0	0	571	†1,234	0	0	0	0	0	41	†36
Texas	414	207	17	13	171	6	1,806,746	20,853	21,023	100	8	2	1	89	4,898	5,490
Dist. 1	30	7	1	1	20	1	87,091	1,218	*3,024	9	0	0	0	9	421	*1,075
Dist. 2	10	4	0	0	6	0	50,672	747	*2,571	0	0	0	0	0	247	*850
Dist. 3	36	14	8	2	12	0	255,227	1,605	....	6	1	2	0	3	437	....
Dist. 4	31	11	4	3	13	0	140,412	1,395	....	9	1	0	1	7	436	....
East	30	14	0	0	16	0	160,983	1,329	1,113	15	1	0	0	14	379	421
Dist. 7-B	52	20	0	0	32	0	185,246	2,831	....	18	2	0	0	16	953	....
West	103	72	0	0	29	2	479,980	5,903	5,548	23	2	0	0	21	848	879
Dist. 9	73	31	0	3	36	3	248,734	4,448	*7,477	16	1	0	0	15	1,065	*2,142
Dist. 10	49	34	4	4	7	0	198,391	1,377	1,290	4	0	0	0	4	112	*123
Utah	6	6	0	0	0	0	35,335	260	138	0	0	0	0	0	122	75
West Virginia	21	1	0	12	8	0	66,817	687	670	2	0	0	1	1	34	27
Wyoming	18	9	0	0	9	0	94,155	845	900	8	1	0	0	7	299	279
Misc. (Fla.)	1	0	0	0	1	0	4,650	131	73	1	0	0	0	1	113	65
Total U. S.	**1,127**	522	25	74	489	17	4,845,788	52,410	56,837	**260**	23	3	4	230	11,492	12,735
Total prev. week	905	427	20	79	366	13	3,893,945	.....	.....	202	16	2	7	177	.....	.....
Cum. 1957	52,410	26,841	629	3,762	20,131	1,047	217,379,712	.....	.....	11,492	1,142	104	381	9,865	.....	.....
Western Canada	35	19	0	3	13	0	152,236	2,845	3,178	13	1	0	0	12	817	.....

*Districts: 2 & 3, 1 & 4, 9 & 7-B, formerly combined. †Incl. New York. ‡Incl. Florida and Georgia.

ROTARY RIGS OPERATING IN UNITED STATES

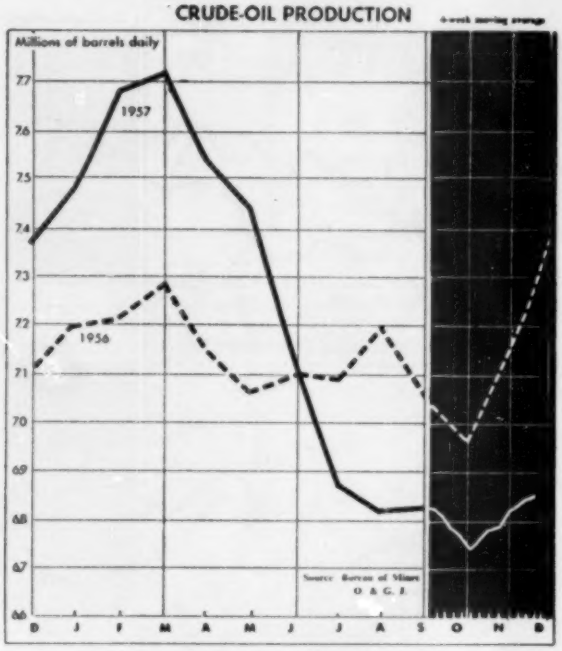


ACTIVE ROTARY RIGS*

Area—	12-23-57	12-16-57	12-9-57	12-24-56
Alabama	9	9	9	8
Arkansas	23	26	29	23
Arizona	1	1	1	....
California	99	100	97	109
Colorado	39	42	47	56
Florida	1	1	2	2
Georgia	....	....	....	....
Idaho	....	....	....	1
Illinois	49	52	57	62
Indiana	10	11	5	13
Iowa	2	2	2	1
Kansas	165	177	162	177
Kentucky	8	15	10	12
Louisiana	392	384	381	473
North	47	40	46	49
South	262	264	256	321
Offshore	83	80	79	103
Maryland	1	1	1	....
Michigan	11	12	12	13
Missouri	....	....	....	....
Montana	29	33	33	32
Mississippi	46	44	50	24
Nebraska	31	37	32	32
Nevada	....	....	....	2
New Mexico	164	167	153	143
New York	1	1	1	....
North Dakota	51	50	48	28
Ohio	1	1	1	....
Oklahoma	248	270	257	271
Oregon	....	....	....	....
Pennsylvania	8	9	9	9
South Dakota	1	1	2	1
Texas	1,066	1,073	997	1,113
Gulf Coast	244	227	215	291
Offshore	4	6	5	6
West	373	405	371	381
North	369	365	349	358
East	76	70	57	77
Tennessee	....	....	....	....
Utah	52	56	56	28
Washington	1	1	1	1
West Virginia	2	2	4	2
Wyoming	70	74	67	60
Virginia	....	....	....	....
Total United States	2,581	2,652	2,526	2,696
Western Canada	189	188	180	234
Eastern Canada	2	2	2	....
Grand total	2,772	2,842	2,708	2,930

*Hughes Tool Co.

CRUDE-OIL PRODUCTION

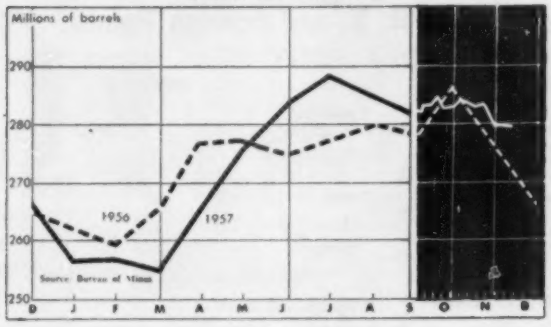


DAILY AVERAGE PRODUCTION FOR WEEK

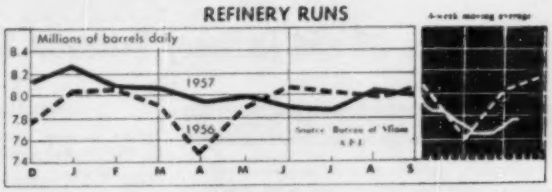
	December 21, 1957			Dec. 14
	Crude oil	Lease condensate	Total	total
Alabama	15,675	.....	15,675	15,700
Arkansas	82,475	225	82,700	82,800
California	930,300	.....	930,300	928,400
Colorado	145,350	.....	145,350	138,900
Eastern	50,100	.....	50,100	52,300
Florida	1,275	.....	1,275	1,275
Illinois	244,400	.....	244,400	233,400
Indiana	32,000	.....	32,000	30,500
Kansas	†346,425	.....	†346,425	†345,550
Kentucky	42,900	.....	42,900	42,800
Louisiana	752,900	80,700	833,600	832,850
North	110,900	2,700	113,600	112,850
South	642,000	78,000	720,000	720,000
Michigan	28,000	.....	28,000	27,700
Mississippi	99,600	4,275	103,875	103,875
Montana	74,750	.....	74,750	75,750
Nebraska	54,900	.....	54,900	55,600
Nevada	100	.....	100	100
New Mexico	257,900	5,500	263,400	262,100
North Dakota	30,150	.....	30,150	28,650
Oklahoma	†580,100	.....	†580,100	†574,200
Texas	2,657,000	58,400	2,715,400	2,715,400
Dist. 1	50,000	550	50,550	50,550
Dist. 2	121,000	9,300	130,300	130,300
Dist. 3	378,000	28,000	406,000	406,000
Dist. 4	197,000	6,400	203,400	203,400
Dist. 5	31,000	450	31,450	31,450
Dist. 6	109,000	6,400	115,400	115,400
East Texas Field	160,000	.....	160,000	160,000
Dist. 7-B	144,000	125	144,125	144,125
Dist. 7-C	151,000	4,075	155,075	155,075
Dist. 8	1,007,000	1,800	1,008,800	1,008,800
Dist. 9	206,000	700	206,700	206,700
Dist. 10	103,000	600	103,600	103,600
Utah	14,100	.....	14,100	13,050
Wyoming	300,200	.....	300,200	304,700
Others	‡200	.....	‡200	‡150
Total U. S.	6,740,800	149,100	6,889,900	6,866,750
Change from prev. week, up			23,150	
Canada	†451,200	.....	†451,200	†398,900
Total U. S. production—Jan. 1-Dec. 21				2,542,748,160 bbl.
Same period last year (crude plus cond.)				*2,543,770,759 bbl.

*Includes 44,319,575 bbl. condensate. †Week ended previous Monday. ‡South Dakota.

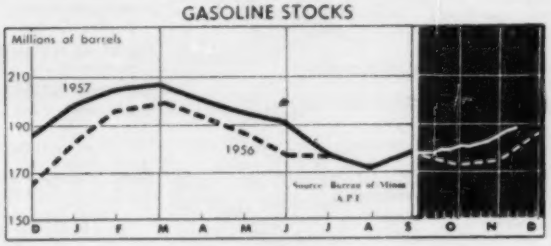
CRUDE-OIL STOCKS



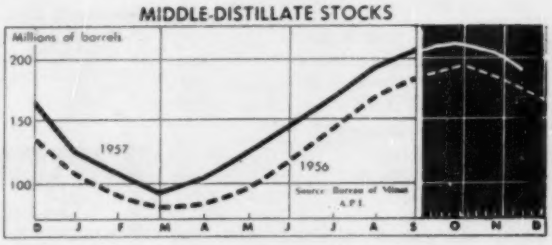
REFINERY RUNS



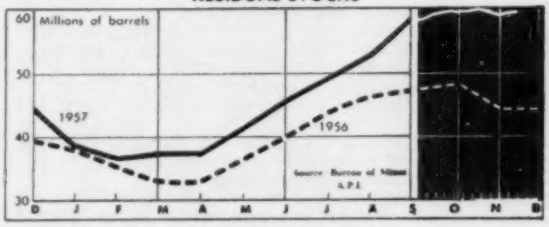
GASOLINE STOCKS



MIDDLE-DISTILLATE STOCKS



RESIDUAL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	12-14-57	12-7-57	12-15-56
Pennsylvania Grade	3,059	3,039	2,418
Other Appalachian	1,765	1,789	2,319
Illinois, Indiana, and Michigan	11,101	11,131	11,332
Nebraska and North Dakota	2,795	2,986	2,451
Kansas	10,241	10,647	10,581
Oklahoma	21,042	20,874	23,110
Arkansas	2,887	2,910	2,919
Louisiana	19,451	19,868	19,078
North	2,849	3,061	4,139
South	16,602	16,807	14,939
Mississippi, Ala., and Fla.	2,645	2,735	2,780
New Mexico	9,271	9,537	8,402
Texas	124,470	123,505	122,777
East Texas	9,157	8,891	8,735
West Texas	56,982	55,096	58,867
Texas Gulf	24,980	25,745	23,739
Other Texas	33,351	33,773	31,436
Wyoming	13,035	13,309	16,303
Other Rocky Mountain	6,698	6,622	7,121
California	34,507	33,772	28,458
Foreign	†16,243	17,027	13,658
Total	279,210	279,751	273,707

*Bureau of Mines. †Includes 5,414,000 bbl. in California.

(Report for December 20 delayed by Christmas holidays)

A.P.I. REFINERY REPORT—DECEMBER 13, 1957

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, December 1956 Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,203	470.3	34.7	356.6	176.7	44,304	12,849	62,808	13,071	1,200	500.1	50.3	329.4	234.3
Appalachian:														
District 1	109	45.1	6.3	23.6	10.6	4,868	609	3,146	663	103	40.2	5.6	25.5	9.1
District 2	106	54.4	9.1	19.7	18.4	2,594	457	1,299	373	108	55.9	6.6	23.4	16.2
Ind., Ill., Ky.	1,376	720.7	68.2	306.4	177.3	32,233	6,154	21,562	5,490	1,481	762.5	82.6	327.3	224.0
Minn., Wis., Dak.	108	53.6	8.3	22.7	11.6	7,007	1,333	7,180	348	97	48.7	4.8	26.3	10.9
Okla., Kans., Mo.	717	404.8	9.6	191.7	45.6	15,363	1,408	12,500	1,257	694	398.3	12.0	194.1	41.4
Inland Texas	254	193.9	9.7	45.9	21.1	7,261	462	2,134	2,108	279	201.8	10.6	53.0	28.0
Texas Gulf Coast	1,783	913.7	114.3	493.3	201.7	25,543	3,215	18,265	7,036	1,949	902.0	120.1	533.0	263.5
La. Gulf Coast	613	352.9	26.2	187.8	53.6	11,468	1,637	8,654	1,210	679	368.8	64.3	190.7	56.2
N La. and Ark.	100	41.3	7.4	22.0	7.3	4,159	1,050	1,993	232	103	42.7	9.9	22.2	6.9
Rocky Mountain:														
New Mexico	28	15.4	0.1	5.6	3.9	427	12	95	75	27	13.9	.4	5.0	3.3
Other Rocky Mt.	269	126.0	2.6	69.4	34.8	5,847	330	2,815	940	267	136.0	6.4	63.4	37.7
West Coast	1,108	513.0	13.1	129.3	346.1	27,771	388	16,824	26,231	1,254	514.8	4.9	187.8	356.3
Dec. 13, 1957	7,774	3,905.1	309.6	1,874.0	1,108.7	188,845	29,904	159,275	59,034	8,141	3,985.7	378.5	1,981.1	1,287.8
Dec. 6, 1957	7,807	3,952.9	349.6	1,842.3	1,084.6	188,087	31,283	163,145	58,839	.....	.....	.....	.....	.....
Dec. 14, 1956	8,000	3,866.6	345.4	1,943.1	1,194.3	177,037	32,418	139,610	43,145	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):

★ Regular (89 octane)	11.25-11.75
★ Premium (98 octane)	14.00-14.50

Gulf Coast (cargoes for coastwise or export movements):

Regular (90 octane)	10.50-11.00
Regular (92 octane)	10.75-11.25
Premium (97 octane)	12.25-12.75
Premium (98 octane)	12.50-13.00

California (rack) (Los Angeles):

Regular (88 octane)	12.2
Premium (96 octane)	14.8
Premium (98 octane)	15.0

Caribbean area (cargoes):

★ Regular (87 octane)	10.375
★ Premium (93 octane)	11.25

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:

Grade 26-70	4.5

Breckenridge:

Grade 26-70	4.0

*If 26-70 natural is considered as 100 per cent, prices for lower-vapor-pressure grades increase 2.5 per cent for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):

Kerosine 42-44	9.875-10.25
Diesel oil (58 d.i. and above)	9.50-10.00
Distillate No. 1	9.50-10.00
Distillate No. 2	8.875-9.25

Gulf Coast (cargoes):

Kerosine 41-43	8.75-9.50
Distillate No. 2	8.75-9.50

New York Harbor (barges):

Kerosine 41-43	10.75
Distillate No. 2	10.25
Diesel fuel, 48-52 d.i.	10.55

Caribbean area (cargoes):

Distillate No. 2	9.00

WAX (LB.)

Oklahoma (Group 3):

132-135 A.m.p. (semi-refined) in tank cars	6.50

New York (export):

126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
Residual fuel (max. 1% S)	$1.60-1.80
Gulf Coast (cargoes):	
Bunker C fuel	$2.50-2.75
New York Harbor (barges):	
Bunker C fuel	$2.95
Caribbean (cargoes):	
Bunker C	$2.55
California (rack):	
Bunker C fuel, Los Angeles	$2.85-3.00

LUBRICATING OILS

Mid-Continent (Group 3):	
150-160 bright stock, solvent refined, 0-10 p.p., 95 v.i.	25.5
200 vis. neutral oil, solvent refined, 0-10 p.p., 95 v.i.	22.25
Pennsylvania Grade:	
★ 145-155 vis. at 210, bright stock, 8 color, 25 p.t.	27
★ 200 vis. neutral (180° at 100°), 25 p.t.	25

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	Mid-Cont.*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour) ($)
14-14.9	$2.67	....	....	....	....
15-15.9	2.71	....	....	....	$1.81
16-16.9	2.74	....	....	....	1.86
17-17.9	2.78	....	....	....	1.91
18-18.9	2.82	....	....	....	1.96
19-19.9	2.85	....	....	....	2.01
20-20.9	2.89	$2.75	....	$2.62	2.06
21-21.9	2.93	2.77	....	2.64	2.11
22-22.9	2.97	2.79	....	2.66	2.16
23-23.9	3.01	2.81	$3.44	2.68	2.21
24-24.9	3.05	2.83	3.46	2.70	2.26
25-25.9	3.09	2.85	3.48	2.72	2.31
26-26.9	3.13	2.87	3.50	2.74	2.36
27-27.9	3.17	2.89	3.52	2.76	2.49
28-28.9	3.22	2.91	3.54	2.78	2.54
29-29.9	3.27	2.93	3.56	2.80	2.59
30-30.9	3.32	2.95	....	2.82	2.63
31-31.9	3.38	2.97	....	2.84	2.67
32-32.9	3.44	2.99	....	2.86	2.71
33-33.9	3.50	3.01	....	2.88	2.75
34-34.9	3.56	3.03	....	2.90	2.79
35-35.9	3.61	3.05	....	2.92	2.83
36-36.9	3.65	3.07	....	2.94	2.87
37-37.9	3.68	3.09	....	2.96	2.89
38-38.9	....	3.11	....	2.98	2.91
39-39.9	....	3.13	....	3.00	2.93
40 and up	....	3.15	....	3.02	2.95

*Includes Oklahoma, part of Kansas, North Dakota, West Texas (sweet) and North Central Texas. †Low cold test Gulf Coast. ‡Sour. §Most buyers are posting Wyoming sour in two schedules, 15°-26.9° and 27°-40°.

Effective dates: California January 17, 1957, east of California, January 3-January 10, 1957; Pennsylvania Grade, July 26, 1957.

FLAT PRICES

Louisiana:	
Bienville (distillate)	$3.05
Ville Platte	3.45
Texas:	
East Texas	3.25
Conroe	3.53
Van	3.08
Pennsylvania Grade:	
Bradford	4.65
Middle District	4.47
Southwest Pennsylvania	4.18
West Virginia	4.00
Buckeye Grade	4.00
Zanesville Grade	3.04
Illinois Basin	3.00-3.15
Canada:	
Leduc-Woodbend	2.74
Redwater (Alta.)	2.63
Smiley (Sask.)	2.40
Pembina	2.61

FOREIGN

Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.75
San Joaquin, 41°-41.9°, Puerto La Cruz	3.34
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26.5°-26.9°, Amuay*	2.55
Quiriquire, 16.5°-16.9°, Caripito	2.45
Lagunillas heavy, flat, Amuay or Las Piedras*	2.38
Bachaquero, flat, Las Piedras*	2.23

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):	
Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Abadan	1.99
★ Iraq, 35.0°-35.9°, Fao	1.98-2.01
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.23
Middle East, E. Mediterranean:	
Arabian, 36.0°-36.9°, Sidon	2.59
Iraq, 36.0°-36.9°, Tripoli, Banias	2.59
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.75

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(Latest reported spot fixtures)

★ Gulf-U.S.N.H., clean (USMC—10%)	$2.57
★ Carib.—U.S.N.H., dirty (USMC—50%)	1.35
★ P.G.-Transatlantic, dirty (USMC—67.5%)	....

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ADVERTISERS in this issue

A

ACF Industries, Incorporated, Valve Division 28, 29
Aldrich Pump Company, The 41
Allis-Chalmers, Construction Machinery Division 50, 51
Allis Co., The Louis 222
Alten Foundry & Machine Works, Inc. 300
American Chain & Cable Helicoid Gage Division 298
American Recording Chart Co. 242
Ampco Metal, Inc. 245
Anaconda Wire & Cable Company 40
Armstrong Machine Works 61
Atlas Powder Company, Aquaness Department 258, 259
Avondale Marine Ways, Inc. 30
Axelson Manufacturing Company, A Division of U. S. Industries, Inc. 194, 195

B

B and W Inc. 231
Baash-Ross Tool Company 71
Baker Oil Tools, Inc. 100
Bank of Montreal, The 210
Baroid Division, National Lead Co. 37, 38
Barton Instrument Corporation 86
Bendix Aviation Corporation 11
Bethlehem Steel Co. 219
Bethlehem Supply Co. 75
Black, Sivalls & Bryson, Inc. 59
Brewster Company, Inc., The 303, 304
Brown & Root, Inc. 173
Bucyrus-Erie 94

C

Cameron Iron Works, Inc. 73
Canadian Bank of Commerce, The 247
Caran Engineering Corporation 227
Cardwell Mfg. Co., Inc. 206, 207
Caterpillar Tractor Co. 198
Chapman Valve Mfg. Co., The 65
Chicago Bridge & Iron Company 171
Chicago Pneumatic Tool Company 264, 265
Chiksan Company 31
Christensen Diamond Products 89
Clark Bros. Co. One of the Dresser Industries 19
Classified Advertising 315, 316, 317, 318
Columbian Steel Tank Co. 202
Comptoir Franco-Belge d'exportation des Tubes d'acier 8
Continental-Emsco Company 46
Continental Motors Corp. 85
Cooper-Bessemer Corp., The 188, 189
Crose Manufacturing Co., Inc., M. J. 225

D

Davison Chemical Company Division of W. R. Grace & Co. 5
Decca Navigator Company Limited 294
Delta Engineering Sales Co. 241
Delta Tank Manufacturing Company, Inc. 261
Detroit Diesel Engine Division, General Motors Corp. 293
Diamond Chain Company, Inc. 266
Dominion Bridge Company Limited 52
Dow Corning Corporation 79
Dowell Incorporated 175
Dresser Industries, Inc. 54, 55
Drilling & Service, Inc. 302
du Pont 84

E

Eaton Manufacturing Company, Axle Division 7
E-I-M Company, Incorporated 96
Engineering Controls, Inc. 91

F

Fairbanks, Morse & Co. 4
First National Bank & Trust Co. of Tulsa, The 253
Fleet-Line Co. 227
Flexitallic Gasket Company 183
Floridin Company 250
Franks Division Cabot Shops, Inc. ..... Inside Back Cover
Fuller Company 82

G

Gates Rubber Co. 230
General American Transportation Corporation 177
General Paint Corp. 224
Geophysical Service, Inc. 276
Grancell, I. H. 290
Graver Tank & Mfg. Co., Inc. 74
Grinnell Company, Inc. 9
Guiberson Corporation 298

H

Haering & Co., Inc., D. W. 213
Halliburton Oil Well Cementing Co. 12, 13
Hammond Iron Works 22
Harvey & Co., Ltd., G. A. 44
Hawthorne, Inc., Herb J. 270
Helicoid Gage Division, American Chain & Cable 298
Hercules Tool Company 291
Houdry Process Corporation 214
Houston Contracting Company 97
Hughes Tool Co. ..... Back Cover
Humble Oil & Refining Co. 45

I

Ideco, one of the Dresser Industries 90
Inferno Co., The 228

J

Jensen Bros. Mfg. Co., Inc. 281
Jet-Lube Inc. 299
Jones Company, The S. M. 63

K

Kennametal, Inc. 97
Kenyon & Sons, Ltd., William 236
Kinzbach Tool Co., Inc. 253
Koenig Iron Works, Inc. 231

L

Larkin Packer Company, Inc. 237
LeBus International Engineers, Ltd. 23
LeGrand Rochester Limited 83
LeTourneau Inc., R. G. 48
Link-Belt Company 15
Lone Star Steel Company 178
Lufkin Foundry & Machine Co. 10

M

Maintenance Mechanical Corporation 285
Mannesmann-Export 27
Manzel Division of Houdaille Industries, Inc. 297
Marsh Instrument Co. 53
Martin-Decker Corp. 306
Martin, Manufacturer, John N. 57
Mathey Machine Works, Inc., C. A. 305
Mayo Hotel, The 224
McKissick Products Corporation 269
Mercoid Corp., The 295
Mid-Continent Supply Company 26
Midwest Piping Company, Inc. 14
Mission Mfg. Company 1
Mixing Equipment Co., Inc. 246
Moore Corporation, Lee C. 280
Mountain Iron and Supply Company 232

N

Nash Engineering Co. 66
National Airoil Burner Co., The 92
National Foam System, Inc. 243
National Tank Company 320
National Tube Division 20, 21
Nordberg Mfg. Co. 76, 77
Norwood Controls Unit Detroit Controls Division of American-Standard 33

O

Oil Equipment Mfg. Co., Inc. 251
Oil Tool Manufacturing Co., Inc. 229
Oil Well Supply Division 6
Olin Mathieson Chemical Corporation, Industrial Chemicals Division 69
Otis Engineering Corporation 292

P

Paris Distributor, Inc., Henry H. 295
Parkersburg Rig & Reel Co. 70
Parsons Company, The Ralph M. 47
Peerless Mfg. Co. 39
Penberthy Manufacturing Company 278
Petroleum Electric Power Assn. 36
Petrolite Corporation 88
Petty Laboratories 257
Pfizer & Co., Inc., Chas 16, 17
Philadelphia Gear Works, Inc. 25
Philco Corporation 78
Porter Company, Inc., H. K. W-S Fittings Division 252
Price Company, H. C. 98
Pritchard & Co., J. F. 32
Procon Incorporated 49
Puget Sound Fabricators, Inc. 244

R

Rector Well Equipment Co., Inc. 34
Reed Roller Bit Company 220, 221
Refinery Engineering Company 67
Refinery Supply Co., The 291
Republic Steel Corporation 286, 287
Ridge Tool Company, The 253
Rockwell Manufacturing Company ..... Inside Front Cover
Rolls-Royce Limited 282, 283
Roper Hydraulics, Inc. 256
Royal Bank of Canada, The 238

S

Sachse Electric Inc. 227
Santa Fe Drilling Company 102
Sargent Engineering Corporation 186
Security Engineering Division 289
Seismograph Service Corporation 272
Shaffer Tool Works 240
Shand & Jurs Co. 185
Shell Oil Company 72
Southern California Oil Tool Company 228
Southern Marine & Aviation Underwriters, Inc. 217
Southwestern Engineering Company 192
Southwestern Industrial Electronics Co. 181
Spencer-Safford Loadcraft Inc. 239
Sun Shipbuilding & Dry Dock Company 24

T

Taylor Instrument Companies 234, 235
Technical Oil Tool Corporation 191
Templeton, Kenly & Co. 231
Thermoid Company 58
Thomas Flexible Coupling Co. 212
Thompson Pump Company 244
Thompson Tool Co. 301
Timken Roller Bearing Company Steel and Tube Division 35
Torrington Company, The 87
Trecker Aircraft Corporation 201
Tulsa Winch Division of Vickers Inc. 216

U

Unit Rig & Equipment Co. 284
United States Rubber Company 56
United States Steel Corporation Oil Well Supply Division 8
Universal Oil Products Co. 42, 43, 60

V

Valley Electric Corp. 298
Vapor Recovery Systems Co., The 95
Virginia Gear & Machine Corp. 25
Vogt Machine Co., Henry 62

W

Wagner Electric Corporation 60
Walker-Neer Manufacturing Company 279
Warner Lewis Company 263
Waukesha Motor Company 64
Welex Inc. 255
Well Equipment Mfg. Corp. 80
Western Geophysical Company of America 61
Wheatland Tube Company 226
Wheeling Machine Products Company 254
Williams & Co., J. H. 280
Williams Brothers 262
Williamson, Inc., T. D. 93
Wilson Manufacturing Co., Inc. 18
Wisconsin Motor Corporation 248
W-K-M Manufacturing Company, Inc., A Subsidiary of ACF Industries Incorporated 28, 29
W-S Fittings Division, H. K. Porter Company, Inc. 252

Y

York Co., Inc., Otto H. 227

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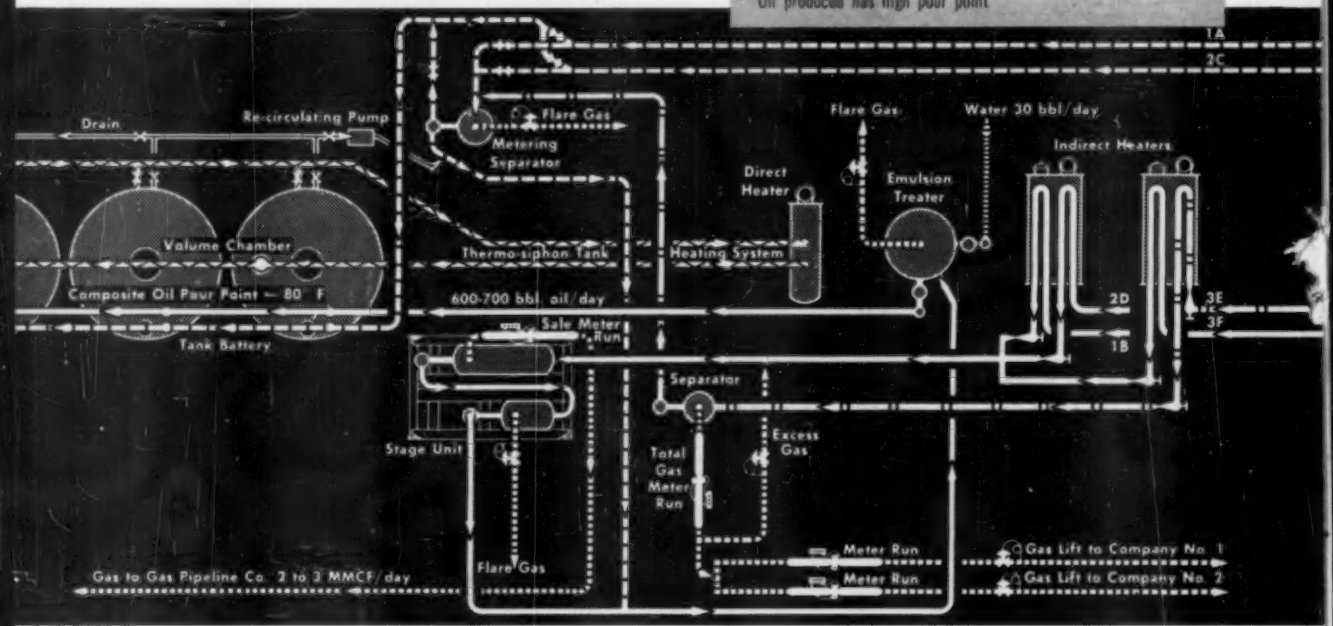

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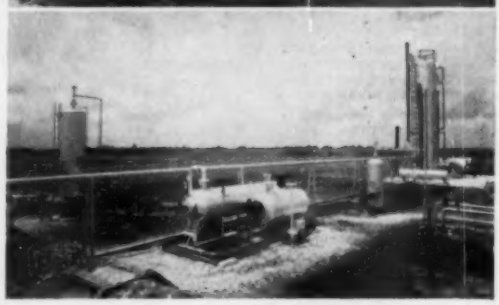

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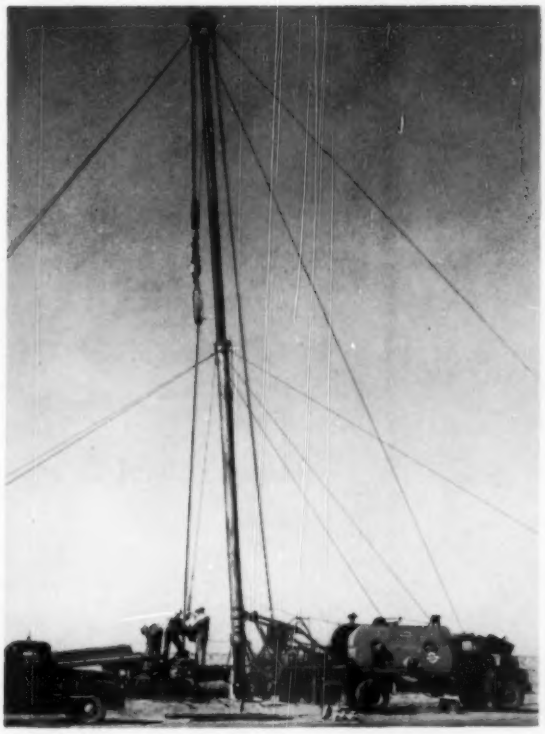

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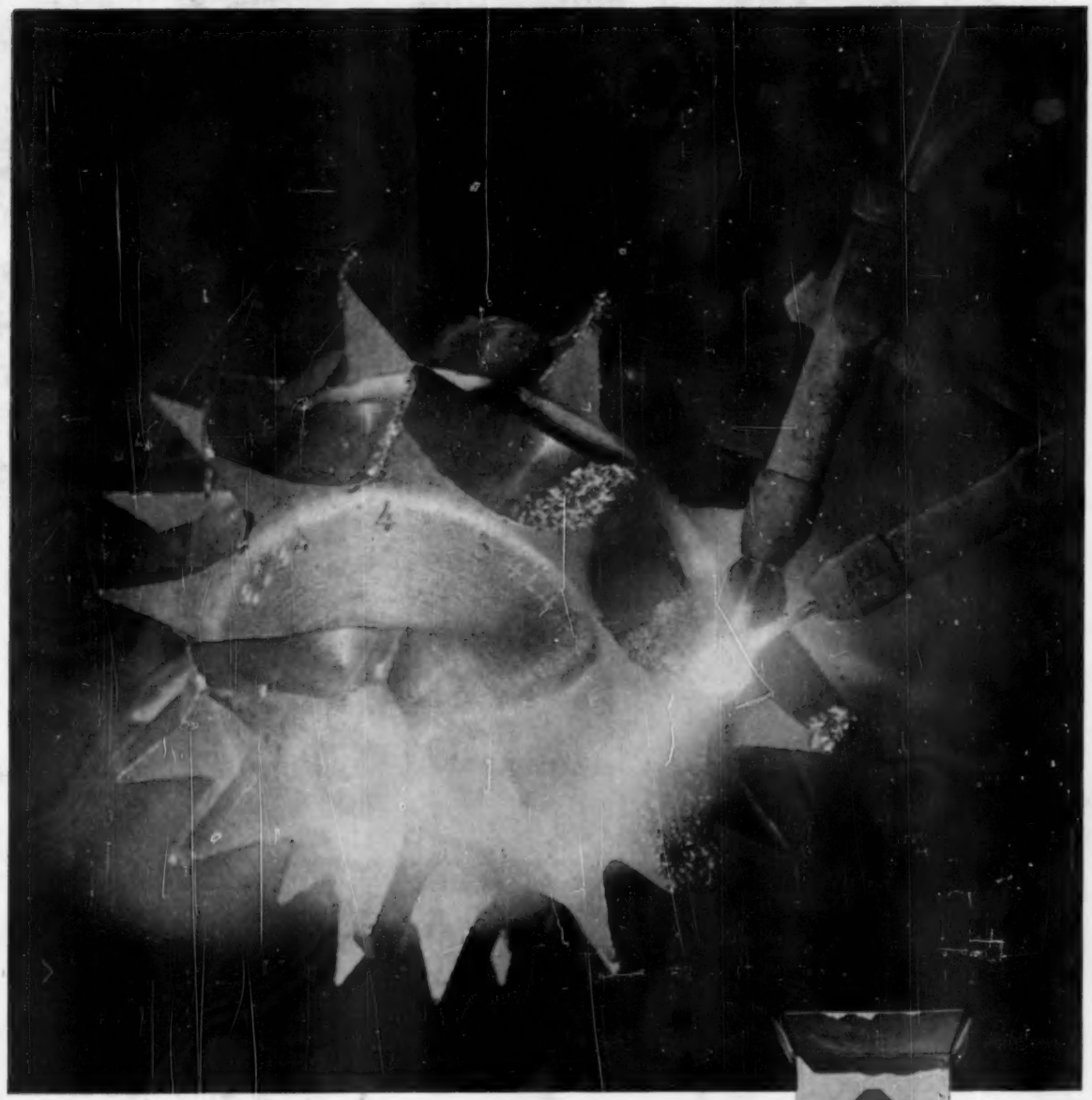

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when and where it's needed!

— another reason you make hole faster with Hughes Rock Bits

How and where hardfacing is applied is as important as the hardfacing material itself.

In getting the facts to determine the *best* application and placement of hardfacing, over one hundred thousand rock bits are examined in the field and the laboratory each year.

The combination of experience, our own superior hardfacing (Hughesite) and the knowledge of just where and how to apply it, is still another reason why HUGHES rock bits can be depended upon to deliver consistent, dependable performance, time-after-time.